PRE-CONVENTION ISSUE May, 1948

THE FOUNDRY

wherever metals are cast!...

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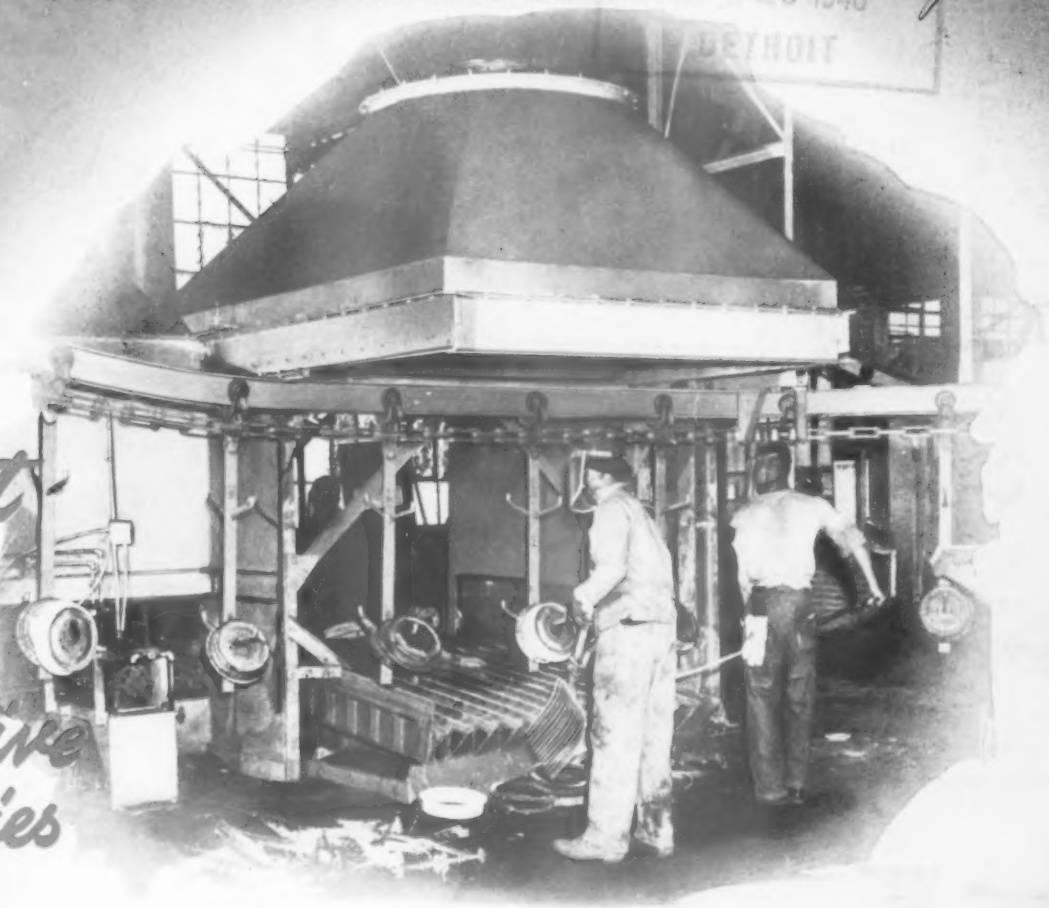
cleaner
•
more efficient
•
more productive foundries



with BARTLETT-SNOW *equipment*

Booth 810
In Philadelphia
May 3rd to 7th

● The smooth uninterrupted flow of castings across the shakeout in a Bartlett-Snow mechanized foundry is a true measure of the skillfulness of the design, and the productivity of the entire installation. Back of it are the sand handling and sand conditioning equipment, the continuous mold conveyors and other facilities, all synchronized into the production schedule—adequate ventilation and dust control, good lighting and ample working areas. Thus job timing and job rating become exact. Foundries become better, more desirable places in which to work, attract a higher grade of workmen,—and profits are bigger too.

THE C. O. BARTLETT & SNOW CO. • *6201 Harvard Ave.* • Cleveland 5, Ohio

Engineering Sales Representatives in New York, Baltimore, Detroit and Chicago

DESIGNING AND CONTRACTING ENGINEERS FOR THE FOUNDRY INDUSTRY

Bourbon Furnace, Bath County, Kentucky, in 1791. Men with guns and a blockhouse were needed to protect ore diggers against warlike Indians.

INTERLUDE IN IRON MAKING . . . 1791

Dangerous and discouraging was the castings business in 1791. Indians sniping from behind rocks and trees . . . bog iron containing phosphorus and other weakening elements—such were the troubles which make those of modern foundries seem trivial. Yet hostile savages and impure ores didn't stop the supply of early castings.

Indians nowadays are no foundry problem, but it is still vital to reduce impurities in cast iron—a job made simpler with PURITE.

In the forehearth, or teapot ladle, PURITE reduces sulfur, permitting close control over refining. In the cupola, PURITE improves combustion, expels occluded gases, reduces oxidation, prevents sulfur pick-up, and washes out non-metallic impurities. The resulting better mixture of cupola iron, coupled with the refining, insures a clean, quiet pouring metal of uniform analysis . . . makes for lower losses, increased strength and improved machinability in the finished casting.

Write for more information about PURITE—what it is and how to use it. The Mathieson Alkali Works (Inc.), 60 East 42nd Street, New York 17, N. Y.

PURITE is commercially pure soda ash containing over 98% sodium carbonate, fused and cast into convenient 2-lb. pigs. Its desulfurizing and refining action are traceable to the chemistry of soda ash.

Mathieson

PURITE

Purite (Fused Soda Ash) . . . Liquid Chlorine
Caustic Soda . . . Soda Ash . . . Bicarbonate of Soda . . . Ammonia, Anhydrous & Aqua
Sodium Chlorite Products . . . Chlorine Dioxide
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Sodium Methylate

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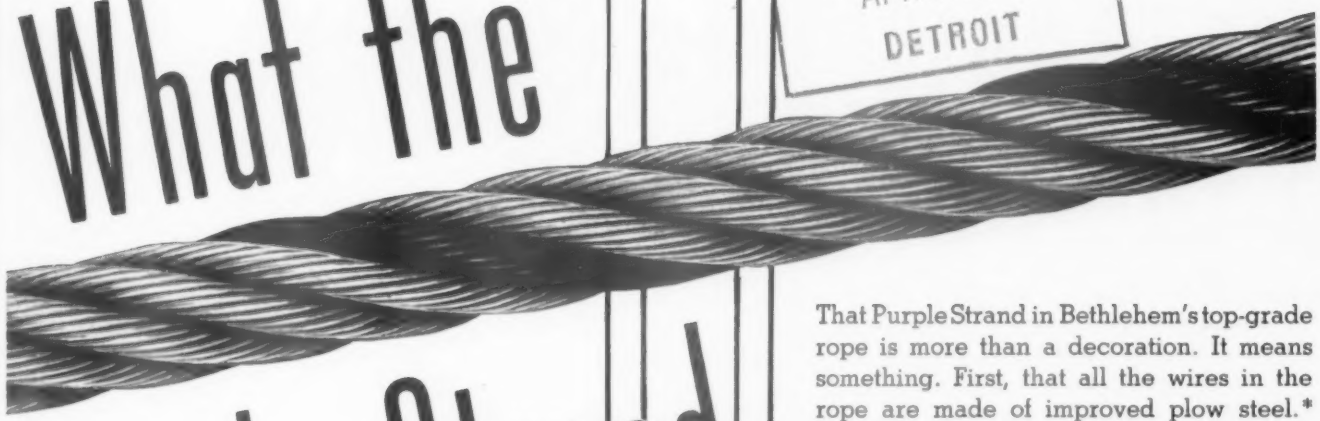
What the Purple Strand means



That Purple Strand in Bethlehem's top-grade rope is more than a decoration. It means something. First, that all the wires in the rope are made of improved plow steel.* Second, that you're going to get a lot of fine service from the rope. Long life, worry-free performance.

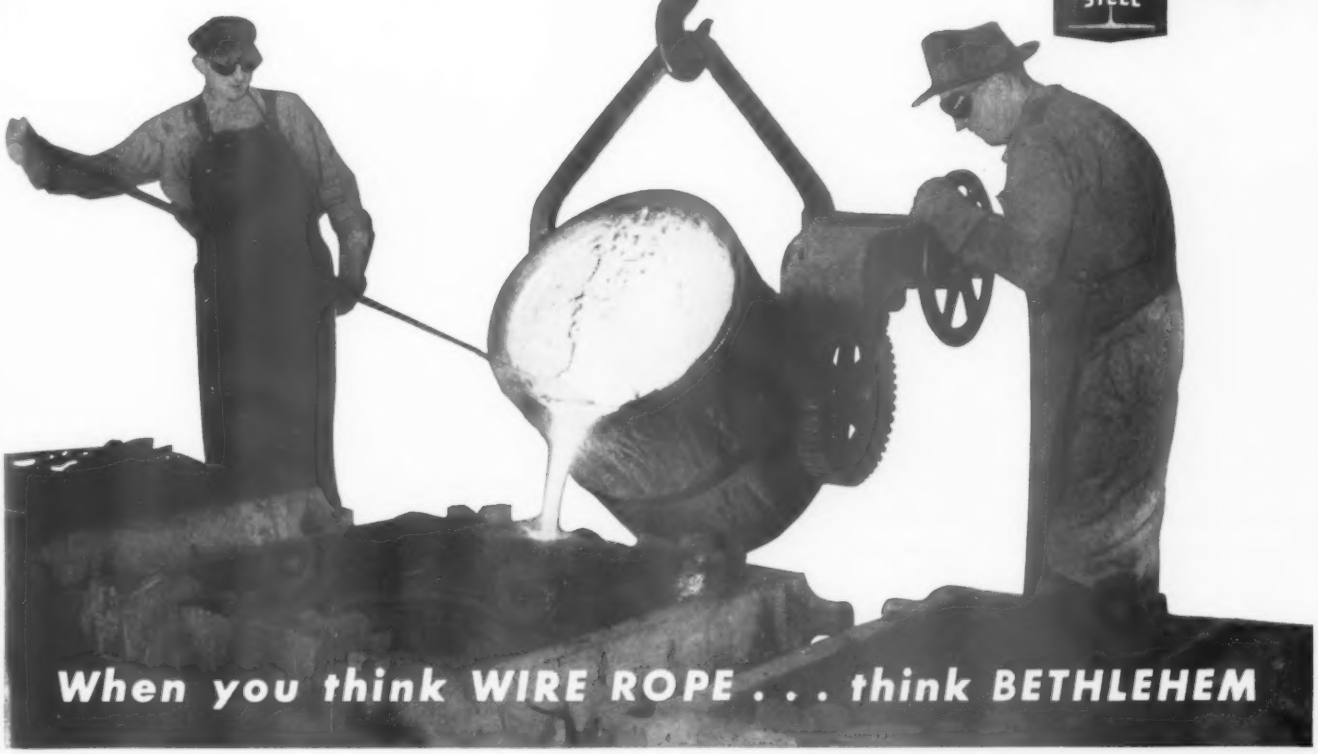
When you need new lines for your cranes and hoists, don't just order "more wire rope." Call the Bethlehem distributor nearest you; ask for Bethlehem Purple Strand by name. It's a strong, durable rope that will easily handle your heaviest foundry loads.

Improved plow is the toughest grade of steel that ever goes into the making of rope.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

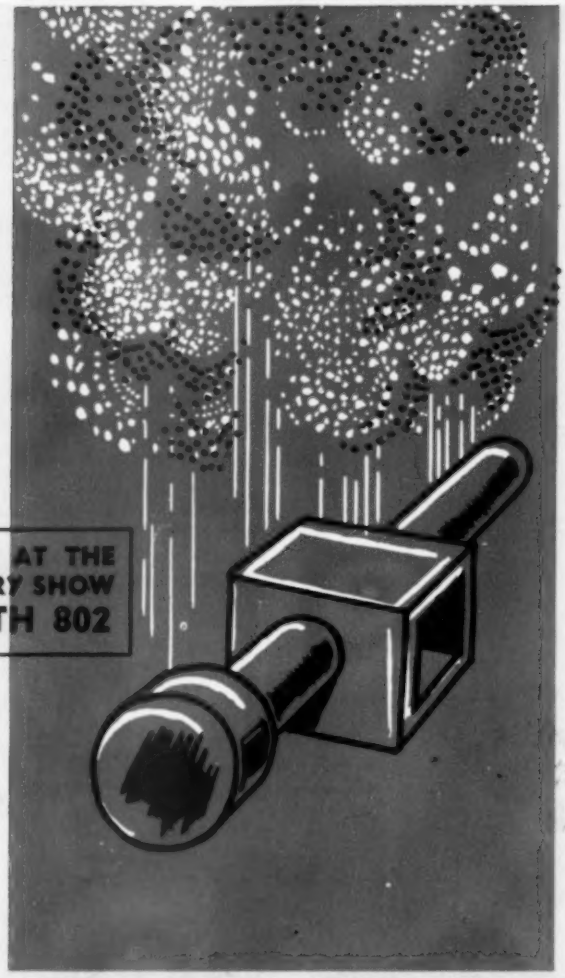
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation



When you think WIRE ROPE . . . think BETHLEHEM

The Answer is Found In the SHAKEOUT . . .



All the things that go into the preparation of a casting—skill, experience, judgement, equipment, materials—are locked in the sand after the metal is poured. The sand, then, carries the greatest burden of responsibility. FEDERAL GREEN BOND imparts any desired strength to the sand, thus eliminating guesswork and insuring results. Foundrymen all over the country place their trust in GREEN BOND day after day, because the pay-off is revealed in the shakeout—cleaner castings, fewer rejects and consistently better work.

GREEN BOND

The Best of the Bentonites

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

Seacoal Plant — Mines

CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • NEW YORK • ST. LOUIS • RICHMOND, VA. • UPTON, WYO

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Pacific Graphite Works, Oakland, Calif. • LaGrand Industrial Supply Co., Portland, Ore.
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MAY, 1948

THE FOUNDRY

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SPRING TONIC...

CORE BOSS JOE STUA ASSEMBLYING DIESEL CYLINDER HEAD CORES.

If your production is limping and lagging... and your costs keep straying out of line—an elixir of information and exhibits offered at the 52nd AFA Convention is just the right remedy to restore your foundry to smooth running productivity. Spend a few days in Philadelphia to examine new equipment and materials . . . learn how research developments can help in your shop... discuss your problems with experts in all fields. Apply this first aid for foundry failings to your troubles back home, and give your shop a new lease on life. BRING YOUR CORE PROBLEMS TO THE LINOIL BOOTH 411 & 512.

The simplest way to solve your core problems is to consult our staff of practical "core engineers". Whatever your problem, you are assured of sound constructive advice gained from 33 years experience in all types of core rooms — and backed up by the proven performance of 600,000 gallons of LINOIL re-ordered monthly.

...for FOUNDRY AILMENTS

CENTURY FOUNDRY • ST. LOUIS, MO.

CENTURY FOUNDRY
A DIVISION OF
CENTURY ELECTRIC COMPANY
(A CORPORATION)
FERROUS ALLOYS
ELECTRIC FURNACE & CUPOLA IRON CASTINGS
3727 MARKET STREET
ST. LOUIS 10, MO.

January 21, 1948

The Werner G. Smith Co.
2191 W. 110th St.
Cleveland 2, Ohio

Gentlemen:

Today, more than ever before, the highly competitive nature of modern business demands accuracy, efficiency and economy in every operation.

Automotive castings have always required extra "know how" to mass produce. Thin, delicate core sections, entirely surrounded by hot metal, require specialized care.

The sensational results we have obtained on intricate jacket work can be attributed directly to the uniformity and dependability of Linoil.

We have found Linoil seldom equalled for our particular type of work.

Yours very truly,

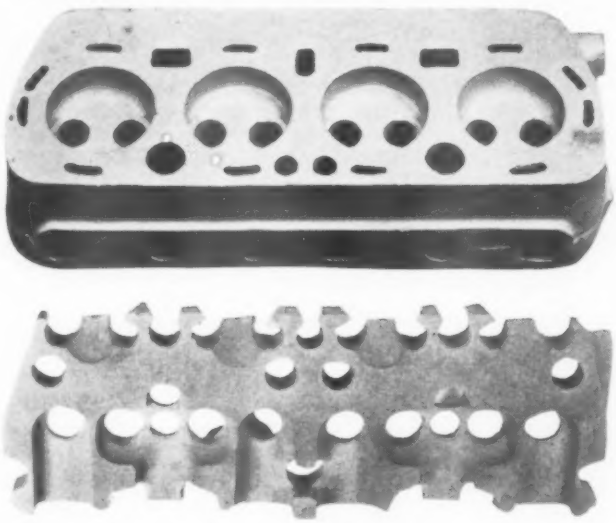
CENTURY FOUNDRY

H. A. Steinbrink

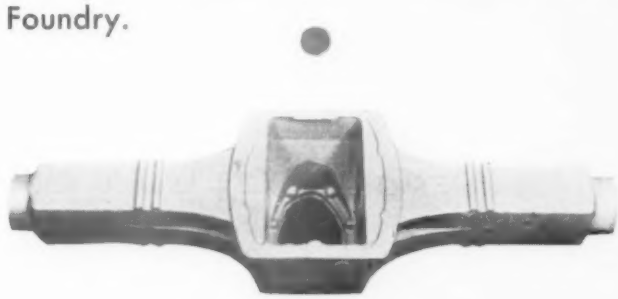
H. A. Steinbrink
General Manager

HAS:JH

Pouring 500 tons of high-quality automotive castings is all in a regular day's work at Century Foundry. Five modifications of their exclusive metallurgical formula, "Carbite", enable this hustling production foundry to readily produce metal possessing a wide range of physical properties that satisfy almost any casting requirements or customer stipulation. Even at their high production volume, extreme care is given to every single phase of "Carbite" production —assuring casting quality that is maintained as rigidly as the composition of the metal itself. LINOIL cores are specified because they can be depended upon to withstand considerable rough handling—always reaching the molds accurately gauged to the rigid specifications required to maintain high-volume quality control at the Century Foundry.



CYLINDER HEAD
CASTING AND CORE



TRACTOR AXEL HOUSING

THE LINOIL — THE LOGICAL OIL

THE WERNER G. SMITH COMPANY

(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)

2191 WEST 110th STREET • CLEVELAND 2, OHIO

Now! Faster, "Continuous Fl

Pangborn Continuous-Flo Rotoblast Barrel Offers You New Production-Line Methods To Double Your Cleaning Output...

CONTINUOUS material flow has always stopped at the shake-out. Succeeding operations have been handled on a batch basis.

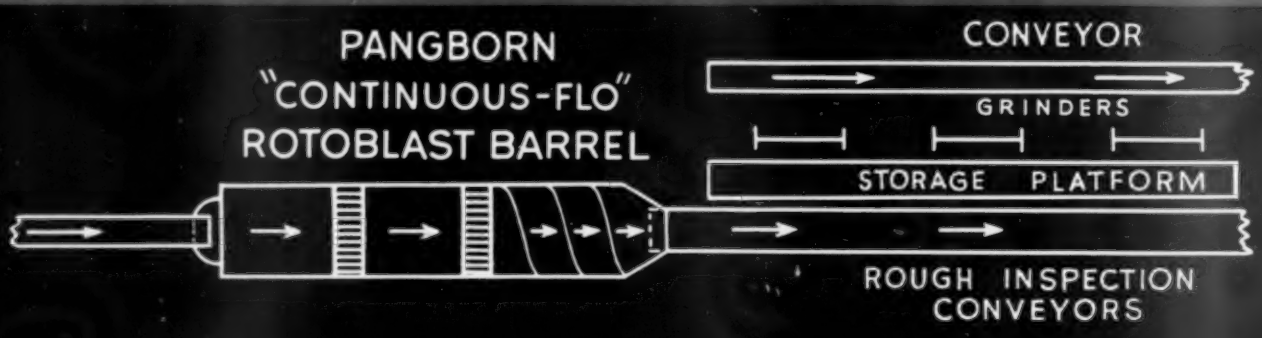
NOW, PANGBORN BREAKS THIS BARRIER with the New *Continuous-Flo* ROTOBLAST BARREL. This remarkable foundry innovation picks up where other phases of continuous handling stop . . . giving you continuous flow from the shake-out, through the ROTOBLAST, and to the grinding and inspection stations WITHOUT ANY MANUAL HANDLING.

Tests have shown that by eliminating loading, unloading and down time the PANGBORN CONTINUOUS-FLO ROTOBLAST BARREL *more than doubles cleaning output* of batch methods.

The CONTINUOUS-FLO ROTOBLAST BARREL, because of its automatic handling, doubles production . . . reduces manpower . . . lowers maintenance . . . and uses much less abrasive per ton of work cleaned. This all adds up to a NEW LOW IN TOTAL CLEANING COST. The diagram below shows how it works.

PANGBORN CORPORATION, 1400 PANGBORN BLVD., HAGERSTOWN, MD.

Pangborn "Triple Play" Knocks Cleaning Cost... With The New Continuous-Flo Rotoblast Barrel



1. from the shake-out
2. through cleaning in the Continuous-Flo Rotoblast Barrel
3. on to grinding and inspection stations

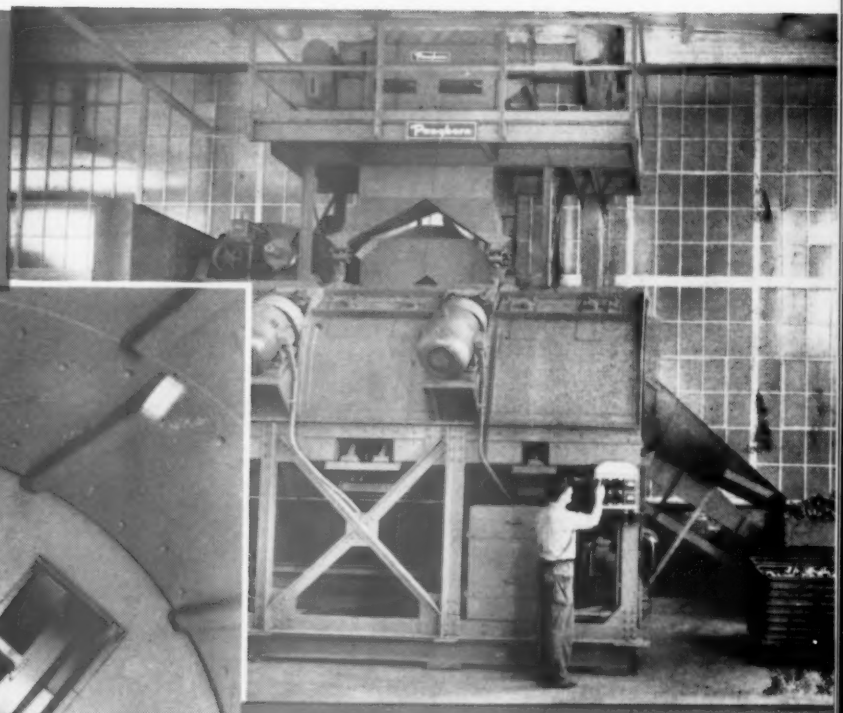
WITHOUT ANY MANUAL HANDLING

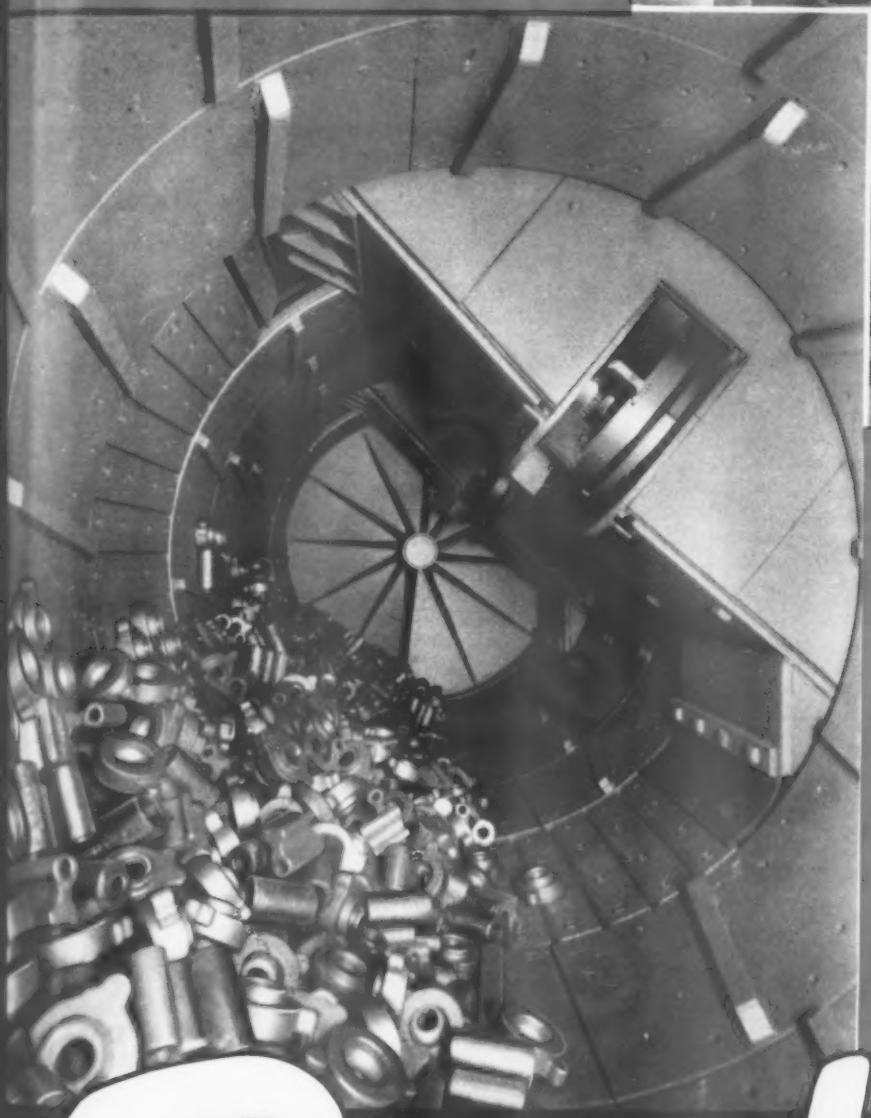
LOOK TO PANGBORN FOR ALL THE LATEST DEVELOPMENTS

us Flo," ROTOBLAST Cleaning...

RIGHT—Here's the whole installation . . . the newest, most revolutionary development in blast cleaning equipment . . . PANGBORN CONTINUOUS-FLO ROTOBLAST BARREL for a new low in cleaning cost.

BELOW—Looking into the New PANGBORN CONTINUOUS-FLO ROTOBLAST BARREL from the feed end shows the castings as they tumble-flo through the abrasive streams.





SEE THE CONTINUOUS-FLO ROTOBLAST BARREL in operation at the 1948 AFA Philadelphia Exposition.

Also showing:

- Rotoblast Table-Room
- Rotoblast Rocker Barrel
- Hydro-Sand Blast Room
- Dust Collectors

Booth No. 905-7-9

More Than 25,000 Pangborn Machines Serving Industry

Pangborn

BLAST CLEANS CHEAPER with the right equipment for every job

NTS IN BLAST CLEANING AND DUST CONTROL EQUIPMENT

AL 53

JUL 48

TONY 48

HANK 42

BILL 35

WES 26

PAUL 13

265

Champion

WITH THREE

1

A new great period in Champion's history now begins with the transfer of all engineering and manufacturing operations to a much larger plant at Rockford, Illinois.

2

For the greater convenience of those members of the industry who wish to consult us we have opened new sales offices at 1553 West Madison Street, Chicago 7, where you are cordially welcome to drop in at any time to talk over your production problems.

AN ACCUMULATED EXPERIENCE O

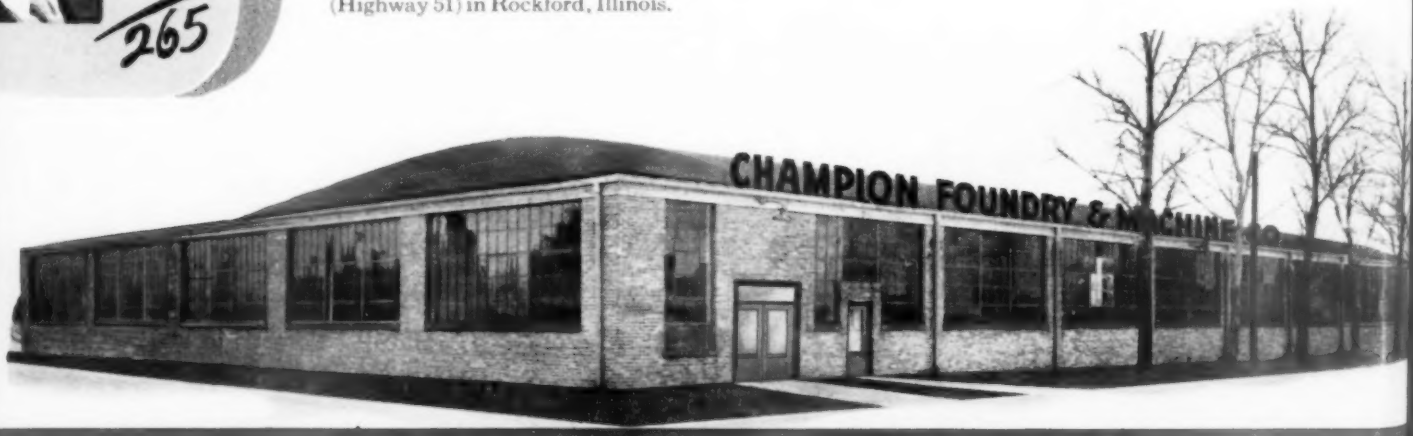
265 "MAN-YEARS'

IN THE SERVICE OF THE FOUNDRY INDUSTRY

Individually the seven principal members of the Magnuson family have served the industry for periods ranging from 53 years down to 13, a total of 265 "Man-Years." This experience, reaching from the development of the first hand stripping plate machine down to the present day high speed production machines, is embodied in the advanced design and outstanding performance of Champion Molding Machines and Core Blowers. The latest achievement of this group is the new Champion Junior Core Blower on view for the first time at Philadelphia.

Location of new offices:
1553 West Madison Street,
Chicago 7, Illinois.
We will all ready for visitors
here, after June 1st, 1948.

The new plant at Harlem Road, just west of North Second Street, (Highway 51) in Rockford, Illinois.



Greets the A·F·A·

IMPORTANT ANNOUNCEMENTS

MEET "JUNIOR" at Philly

3

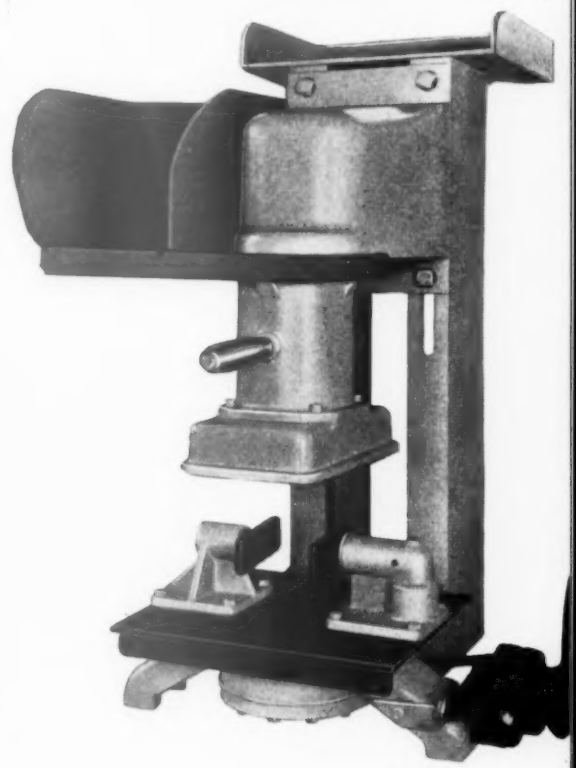
It's The New Champion Core Blower

The "JUNIOR"

Completely new, the Champion Junior Core Blower makes its bow to the Foundry Industry at the A. F. A. Exhibit, in Philadelphia, May 3-7. Be sure you set aside some of your sightseeing time to give this machine a thorough inspection. It will be in complete operation every day in the Champion Booth, Space 803, in the Exhibition Hall.

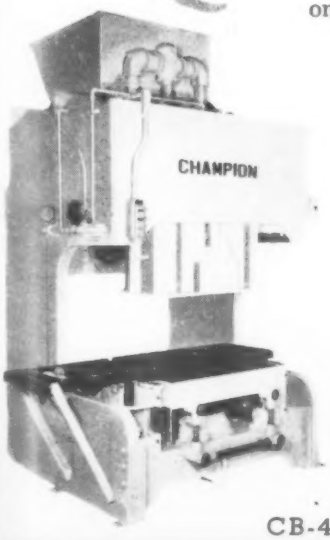
New—all new—yet a Champion through and through, with all the characteristic features that have made Champion Core Blowers of every size and model the standard and favorite in modern foundries, from coast to coast.

Step up and handle the simple, one step control. See how quickly, easily, completely it performs its operations.



Representatives of the complete Champion line of Molding Machines, Jolt Squeezers, Core Blowers and the Electric Riddle on display here, make the Champion exhibit a "positive must" on your tour of the Exhibition Hall.

"JUNIOR"
A worthy member of a great family



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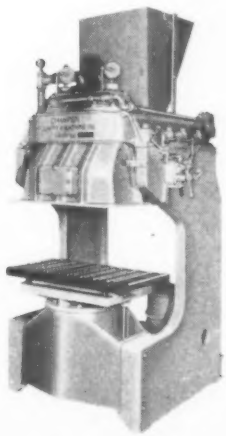

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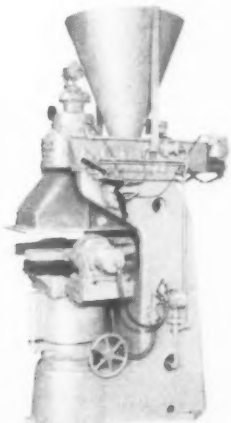

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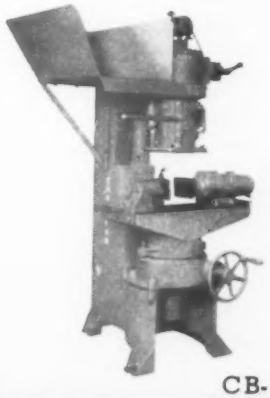

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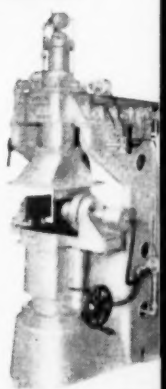

CB-

CHAMPION FOUNDRY & MACHINE CO.

SALES OFFICE: 1553 W. MADISON ST.
CHICAGO 7, ILLINOIS

GENERAL OFFICE AND PLANT:
ROCKFORD, ILLINOIS

MOLDING MACHINES
CORE BLOWERS
ELECTRIC RIDDLE

At the Foundry Show—Booth 748

See the New CP Pneumatic Steel Clad Grinder

For maximum removal of metal, constant speed governor of *CP Pneumatic Grinder* holds wheel at most efficient cutting speed, from no load to full load.

Steel clad spindle and motor housings resist wear . . . movable exhaust ports can be locked in any desired position . . . easy action throttle valve takes jerk out of starting . . . models for 4″, 6″ and 8″ diameter wheels . . . speeds from 2000 to 9000 R. P. M. . . . 20″ and 35″ extension spindles available.

* * *

CP FLOOR and **BENCH SAND RAMMERS** are designed for instant acceleration from a fast, hard blow to an exceedingly rapid but light stroke, and vice versa.

CP CHIPPERS, of both Simplate and Ring Valve types, are made in a range of sizes to meet every requirement.

CP CORE KNOCK-OUT MACHINE on aluminum, bronze and malleable castings up to 25 pounds gives four times the output of conventional portable air chipping hammer methods.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

AIR COMPRESSORS • ELECTRIC TOOLS • PNEUMATIC TOOLS • DIESEL ENGINES
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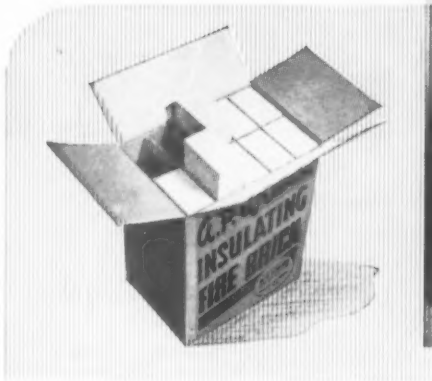
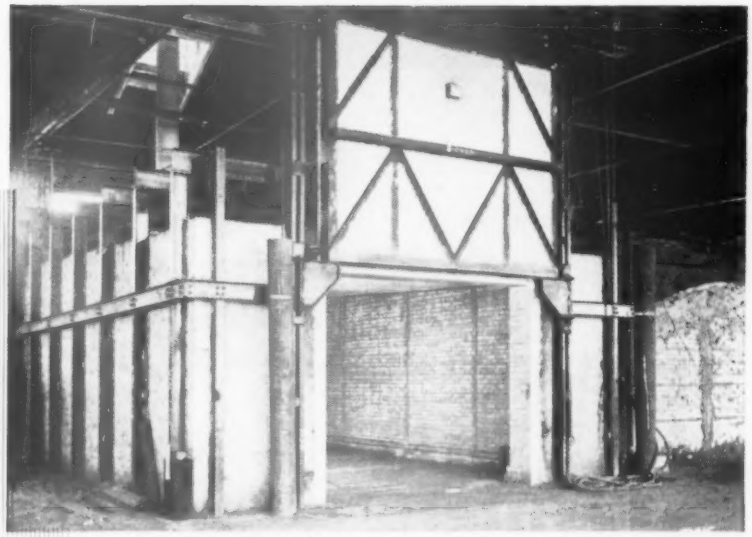
I. F. B.* will *Reduce Your Annealing Costs*





A. P. Green Insulating Firebrick used in this 15' x 23' pulverized coal fired annealing furnace. LOWER FUEL COST—FASTER ANNEALING CYCLES—CLOSER TEMPERATURE CONTROL is obtained through the use of insulating firebrick regardless of the fuel used.

*A.P.Green** Insulating Firebrick

LOWER FUEL COSTS

Low heat conductivity and low heat capacity of A. P. Green Insulating Firebrick make them exceptionally well suited for use in malleable annealing furnaces. Because of these properties, heat loss through the furnace walls is considerably reduced. These heat-confining brick make it possible to reach "heat peak" with less fuel—resulting in a material SAVING for you.

FASTER ANNEALING CYCLE

A. P. Green Insulating Firebrick's high insulating and quick heating properties enable your annealing furnace to reach the required temperature in a shorter period of time. Result—faster annealing cycle—INCREASED PRODUCTION.

CLOSER TEMPERATURE CONTROL

The quality of your annealed castings is affected by the degree of control you have over furnace temperatures. A. P. Green Insulating Firebrick keep the heat where it belongs—less variation is encountered—you can be sure of consistent temperatures. Closer temperature regulation is possible.

This temperature control results in HIGHER QUALITY CASTINGS—FEWER rejected units—all of which means SAVINGS in time and materials.

SPECIAL SHAPES

Special sizes and intricate shapes made in I. F. B. quality can be furnished to meet your specifications. Shipments made promptly.

KAST-O-LITE . . .
Insulating Castable Refractory

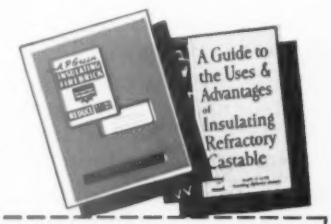
Frequently, this "many-purpose" castable is used in conjunction with insulating firebrick in annealing furnace linings. KAST-O-LITE has essentially the same properties as A. P. Green Insulating Firebrick and is of particular value for flat suspended arches and under-floor insulation.

KAST-O-LITE is also used as a complete lining for many furnaces where a castable insulating refractory is preferred.

A. P. Green REFRACTORY PRODUCTS

District sales offices and distributors with warehouse stocks in the principal cities of the world.

SEND NOW

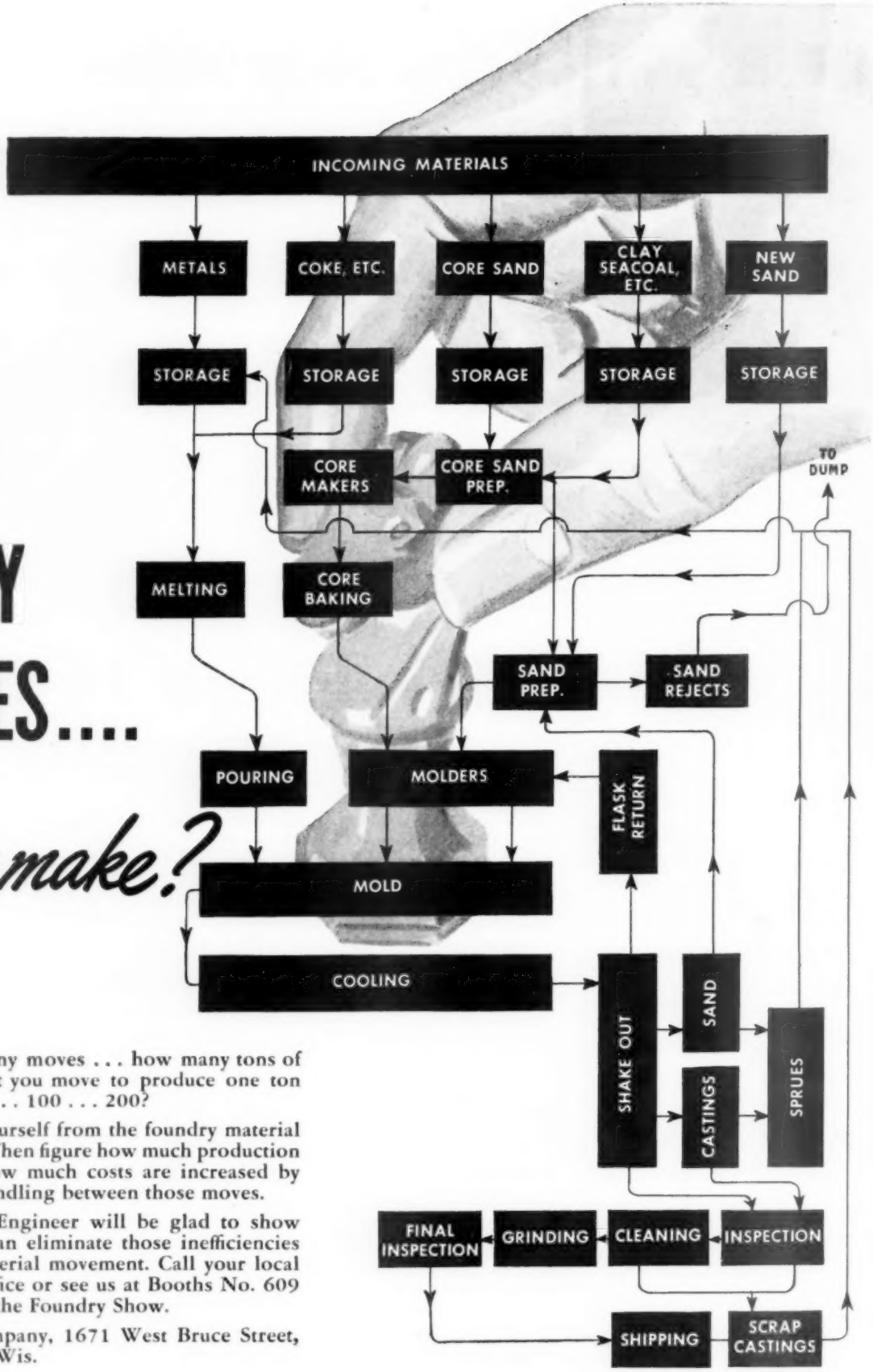


A. P. GREEN FIRE BRICK CO., MEXICO, MO.
Please send me Insulating Refractory literature on:
☐ A. P. Green INSULATING FIREBRICK
☐ A. P. Green KAST-O-LITE

My name_____
Company name_____
Address_____
City_____ Zone____ State_____

A. P. GREEN FIRE BRICK CO., Mexico, Mo.

HOW MANY MOVES.... *do you make?*



How many moves . . . how many tons of materials must you move to produce one ton of castings—50 . . . 100 . . . 200?

Figure it out yourself from the foundry material flow chart above. Then figure how much production is lost . . . how much costs are increased by inefficient handling between those moves.

A Rex Foundry Engineer will be glad to show you how you can eliminate those inefficiencies in your material movement. Call your local Rex Field Office or see us at Booths No. 609 and 611 at the Foundry Show.

Chain Belt Company, 1671 West Bruce Street, Milwaukee 4, Wis.

CHAIN BELT REX COMPANY

FOUNDRY HANDLING SYSTEMS

Stainless Steel is TOUGH

tough to cut, too—but LINDE makes the job easier . . . just as easy as cutting carbon steel

LINDE's powder-cutting process overcomes the barrier to fast and economical cutting of stainless or chromium steels.

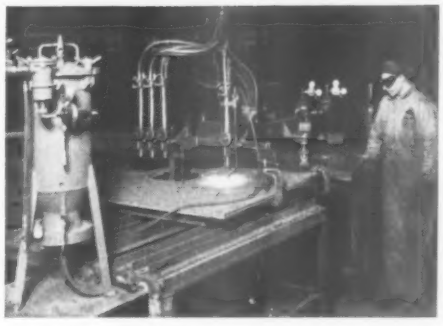
By means of easily installed attachments for standard oxy-acetylene equipment, powder-cutting can be done without substantial change from carbon steel cutting techniques.

IN FOUNDRIES—

by powder-cutting, risers are removed 20 times faster than by older methods. Removal of riser pads and gouging out defects can be done at considerable savings in cost.

IN STEEL MILLS—

a 12,000-lb. ingot can be powder-scarfed in 4 to 6 hours—about 1/10 the time required for grinding. Sizing of ingots, billets, and slabs, removal of hot tops, scrapping operations, and many other cutting jobs can be done in a fraction of the time previously required.



IN FABRICATING PLANTS—

a stack of twelve 10-ga., type-304 stainless sheets were powder-cut at 8 in. per min. . . . 4-in. I.D. by 8-in. O.D. flanges on ½ in., type 316 plates were made in 2 minutes of cutting time apiece.

If you work with stainless steel you will want to know more about this LINDE process. LINDE can supply the equipment you need, help you to set up, and supply the training help you need.

Linde

The word "Linde" is a registered trade-mark of The Linde Air Products Company.

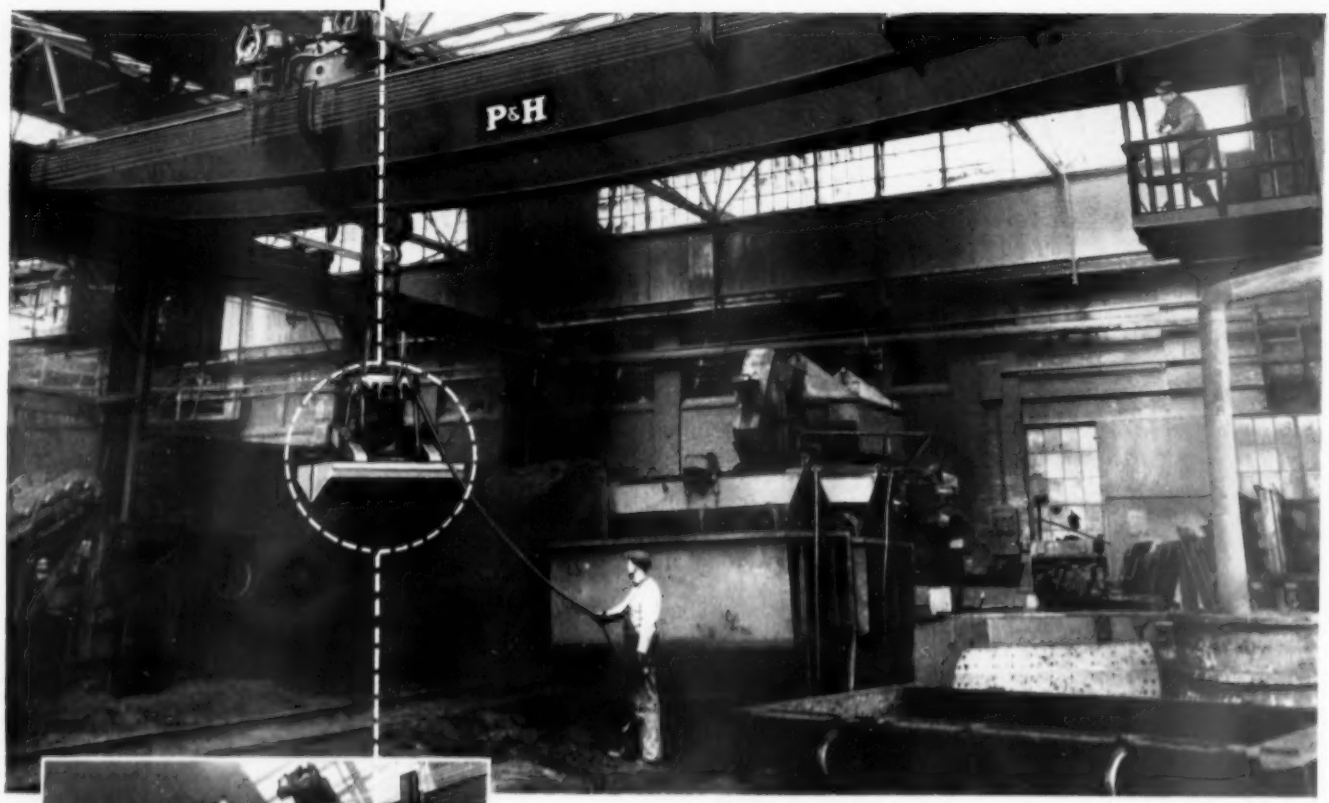
THE LINDE AIR PRODUCTS COMPANY

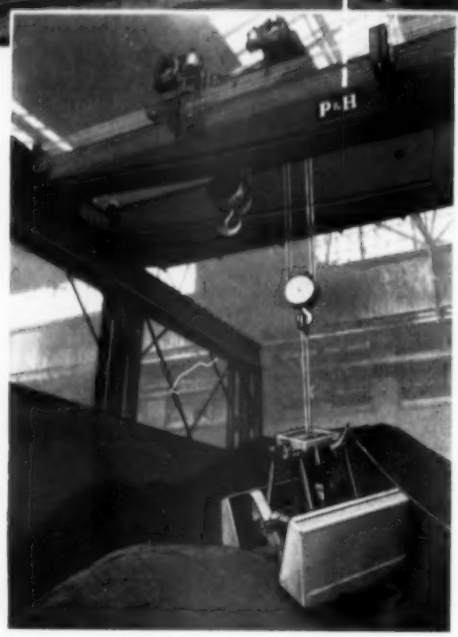
Unit of Union Carbide and Carbon Corporation

30 East 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

P&H SINGLE LINE GRAB BUCKETS





a "*Natural*" in foundry service!

In a matter of seconds you can attach the P&H Single Line Grab Bucket to your crane hook and it's ready to go to work. It's as simple as that — and it provides easy, accurate one-man operation. It works fast, bites deep, picks up clean.

Here's the fast, easy way to handle all kinds of bulk materials — sand, coke, crushed stone, cinders, etc. It's widely used to unload cars, dig pits, fill flasks, etc. A "natural" for foundry use if there ever was one.

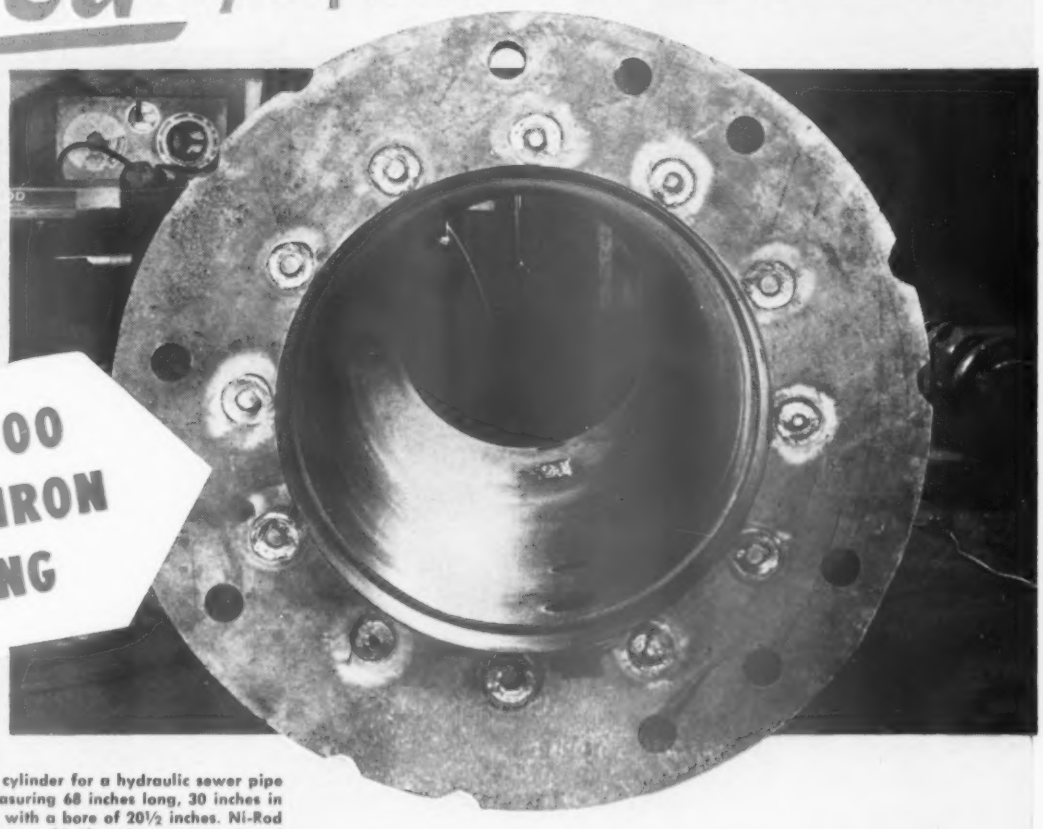
Available in capacities from ½ to 2½ yds. Write for all the facts about it. Ask for Bulletin C-27.

P&H

GRAB BUCKETS
4405 West National Avenue
Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION
ELECTRIC CRANES · EXCAVATORS · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS

Saved by 5 pounds of NI·ROD...



Cast iron cylinder for a hydraulic sewer pipe press, measuring 68 inches long, 30 inches in diameter, with a bore of 20½ inches. Ni-Rod was used to weld plugs into unwanted stud holes, and fill a mislocated oil groove.

Here is a case where a small dose of Ni-Rod* cured a large technical headache.

When it was discovered that a relatively slight machining error had ruined an expensive 2500 pound casting, technicians of a West Coast machine company were dismayed.

The casting was to be used in a hydraulic press for forming sewer pipes. The mere matter of a mislocated oil groove—measuring only 7 inches long, 2 inches wide, and 1 inch deep—had rendered the cylinder useless for its intended purpose.

Remedies of all kinds were suggested but were regretfully discarded as impractical. When hope of saving the casting by ordinary means had faded, specialists of the Pacific Metals Company, Ltd., Los Angeles, were called in. They were immediately optimistic. They suggested welding with Ni-Rod.

Work was started at once. Welders carefully filled the misplaced oil groove with Ni-Rod. At the same time, still another alteration was attempted. 12 unwanted stud holes were blocked up by welding in cast iron plugs.

When the final remachining was complete, it proved almost impossible to tell where the welding had been done. The repair was successful in every respect, and spirits soared at the machine company's plant. With 5 pounds of Ni-Rod, costing only $7.50, they had saved a 2500 pound casting that had cost $1,000!

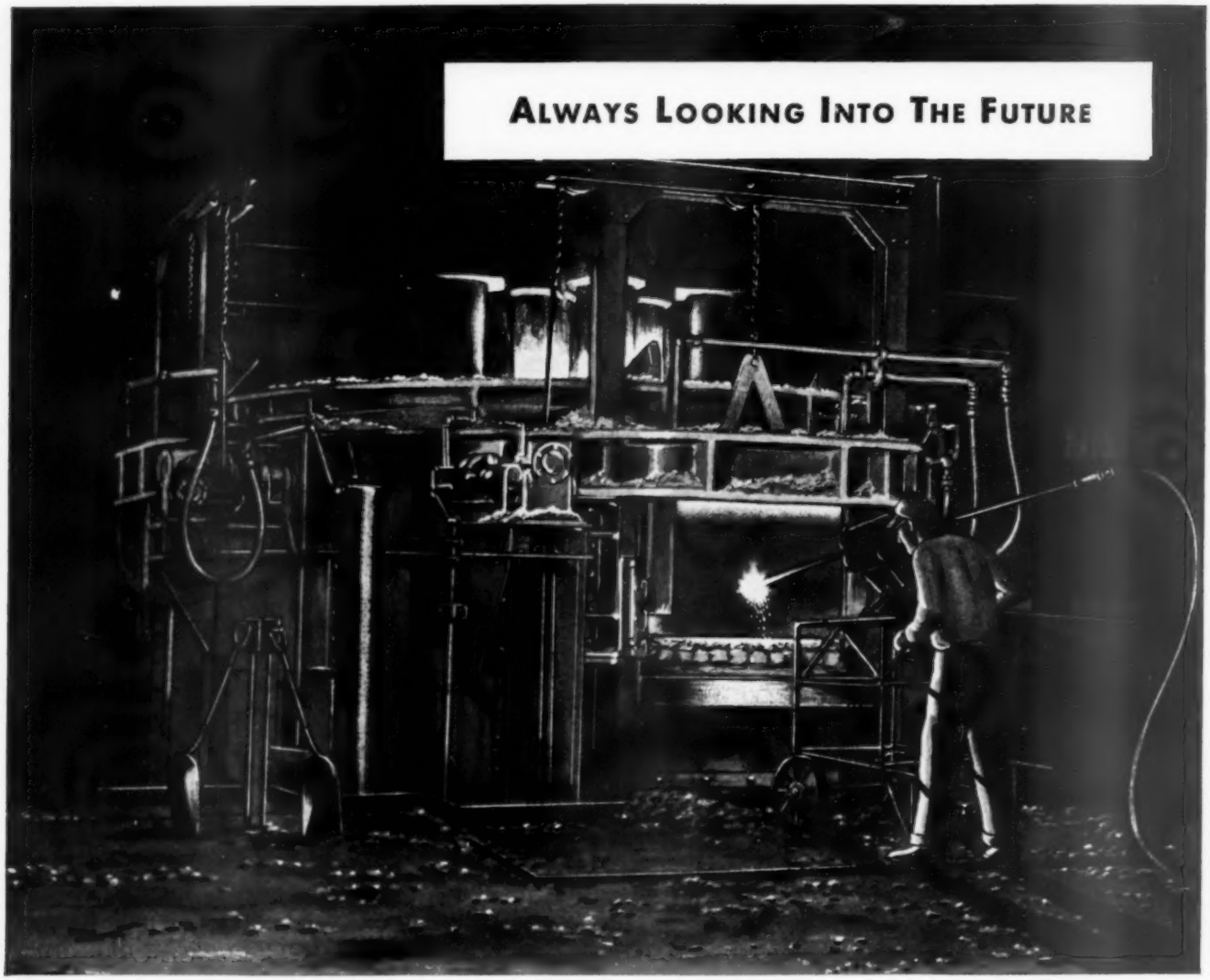
Reports such as this—reports of Ni-Rod's superior performance—are coming in from all parts of the nation. Shops everywhere are turning to Ni-Rod for better welds in cast iron, and dependable welds of cast iron to steel. If welding plays a part in your production or maintenance operations, find out more about Ni-Rod without delay. Send for your copy of "For Machinable Welds in Cast Iron." *Reg. U. S. Pat. Off.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

EMBLEM OF SERVICE
INCO NI-ROD
TRADE MARK

GET NI-ROD FROM:

Whitehead Metal Products Company, Inc.
Steel Sales Corp. — Williams and Company
Pacific Metals Company, Ltd. — J. M. Tull Metal & Supply Co.
Eagle Metals Co. — Metal Goods Corporation
Robert W. Bartram, Ltd. — Alloy Metal Sales, Ltd.
Wilkinson Company, Ltd. — Metal & Thermit Corporation
Hollup Corporation — National Cylinder Gas Company



Airco makes possible new advances in electric furnace steel production

Air Reduction's continuing research and development program for new uses of oxygen for the steel industry has brought forth a promise of new benefits for electric furnace steelmaking methods.

At present, this metallurgical use of oxygen falls into three fields: (1) as an aid to scrap melting, (2) as a means of controlling bath temperature, and (3) to accelerate decarburization.

This new use of oxygen offers steel men many advantages over former electric furnace production methods. Power savings on oxygen treated heats are as much as 20%. Carbons in the 0.025 to 0.05 per cent ranges are easily obtained. Furnace refractories are in better condition because they are held at high temperatures for shorter periods.

Research on this use of oxygen is only one phase of the Air Reduction program. This same forward thinking is at work in the further development of these oxygen processes, and also in the perfection of metallurgical uses of other industrial gases for flushing, desiliconization, desulphurization, and similar related processes.

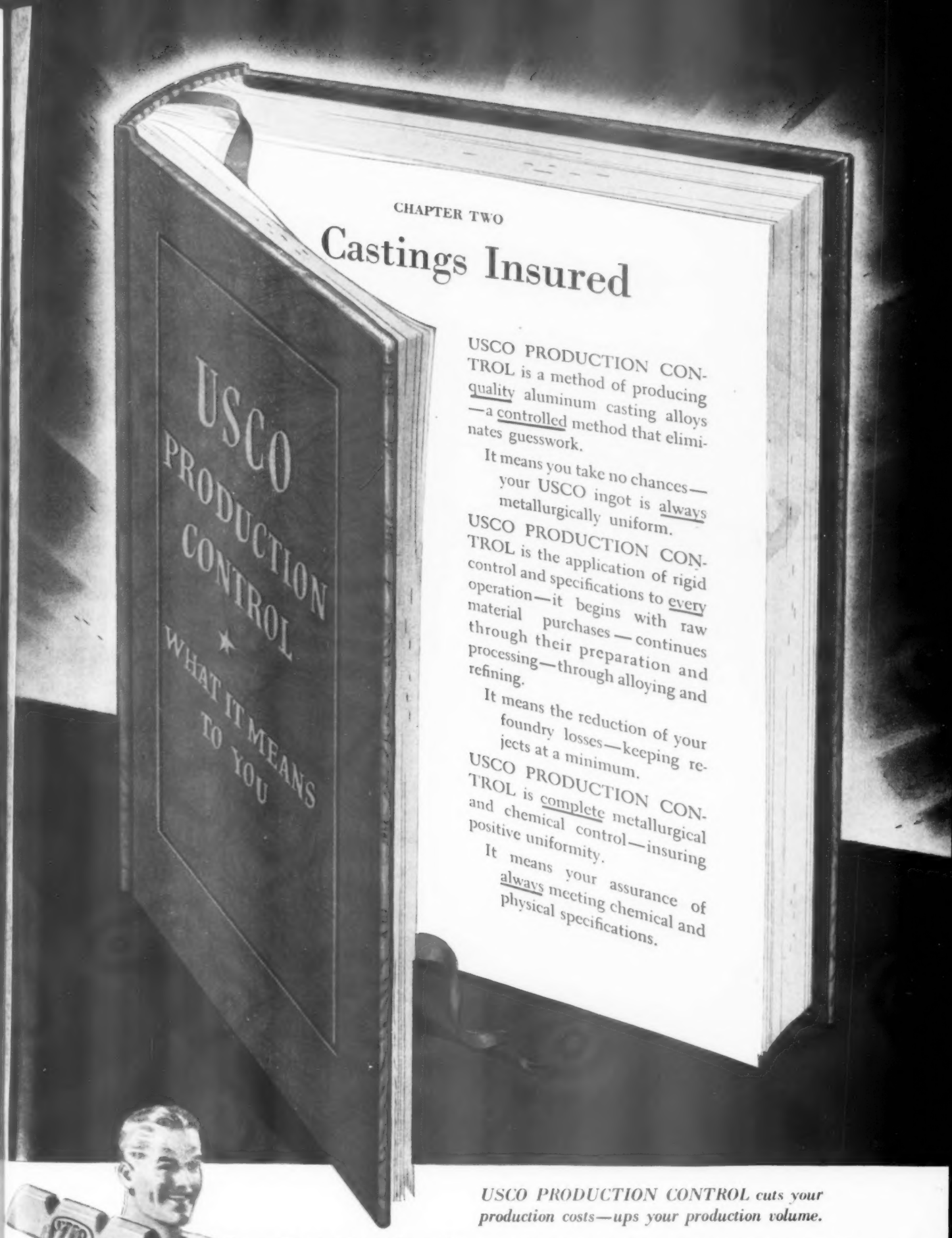
Don't miss our Booth at the American Foundrymen's Assn. Show—May 3 to 7.

If you would like more data on oxygen in electric furnace steelmaking, as well as data on other new processes as they are developed, write us immediately. We will place your name on a list to receive all releases as they are issued. Address Dept. F- 8518, Air Reduction, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. On West Coast: Air Reduction Pacific Company, San Francisco 4, Calif.

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

Headquarters for Oxygen, Acetylene and other gases . . . Carbide . . . Gas We'ding and Cutting M chines, Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories



CHAPTER TWO

Castings Insured

USCO PRODUCTION CONTROL is a method of producing quality aluminum casting alloys—a controlled method that eliminates guesswork.

It means you take no chances—your USCO ingot is always metallurgically uniform.

USCO PRODUCTION CONTROL is the application of rigid control and specifications to every operation—it begins with raw material purchases—continues through their preparation and processing—through alloying and refining.

It means the reduction of your foundry losses—keeping rejects at a minimum.

USCO PRODUCTION CONTROL is complete metallurgical and chemical control—insuring positive uniformity.

It means your assurance of always meeting chemical and physical specifications.

USCO PRODUCTION CONTROL cuts your production costs—ups your production volume.

USCO ALUMINUM

Pioneer Producers of Quality Aluminum Ingot

U. S. REDUCTION CO. *East Chicago, Ind.*

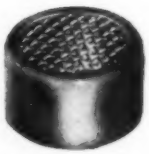
SMILLIE
ACCEPTED BY FOUNDRIES EVERYWHERE

1 CORE BOX VENTS

SLOTTED OR SCREEN

"D" Type

"S" Type

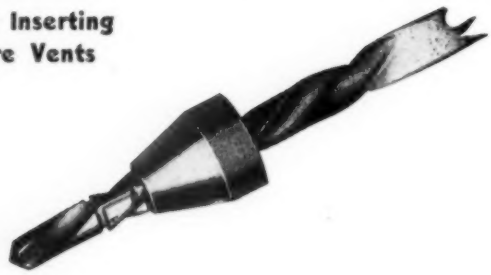


.030 Mesh

Eliminate your rejects with Smillie core vents. May be adapted to the practice in your foundry. Rapid escape of air is of utmost importance in blowing cores, and our line of vents is designed to give greater performance and longer life.

2 INSERTING DRILL

For Inserting Core Vents



The Smillie inserting drill will give you uniformity of hole; correct depth; faster and easier insertion of vent.

3 VENT CLEANER

For Cleaning Slots

The Smillie vent cleaner is made of tempered steel, is extremely strong and easy to use. Remember all Smillie products are accepted by foundries everywhere.

Manufactured By

C. M. SMILLIE & CO.

1124 WOODWARD HGTS. FERNDALE 20, MICH.

TOOLS • PRECISION MACHINED AND GROUND PARTS • FIXTURES

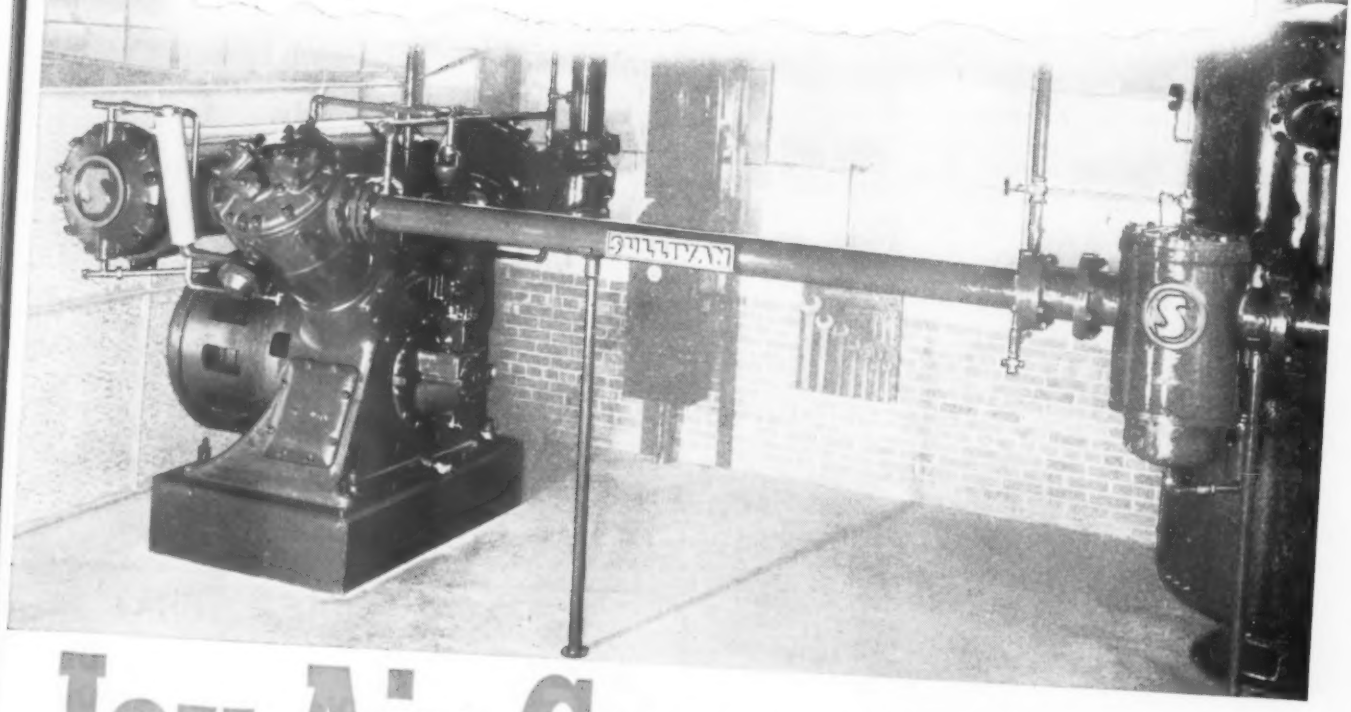
SPACE SAVER

THAT PROVIDES LOW-COST COMPRESSED AIR

SERIES WN-112
for capacities of 378 to 1828 cfm, pressures up to 125 psi

If space is precious in your plant, that's one more reason why you'll want to specify the Joy WN-112 Compressor. It's more compact than other compressors of equivalent capacity because of its advanced design and use of alloy metals—and it operates more economically . . . gives longer heavy duty service. Installation is simple, and maintenance low.

For full details write for bulletin A-52



Joy Air Compressors

PORTABLE AND STATIONARY — ¼ HP TO 600 HP
ALWAYS DEPENDABLE!

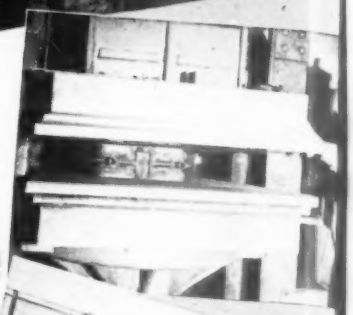
Consult a Joy Engineer

W&D 1512

SULLIVAN DIVISION
JOY MANUFACTURING CO.
GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.

"Your Foundry Flasks Are Precision Tools"

. . . and every step along its huge assembly line, B S & B is meticulous in its effort to provide you with the finest. Welding, hydraulic truing, grinding and drilling of pinlugs (top to bottom) are done by experts. Again and again, each flask is inspected to insure perfect compliance with specifications.



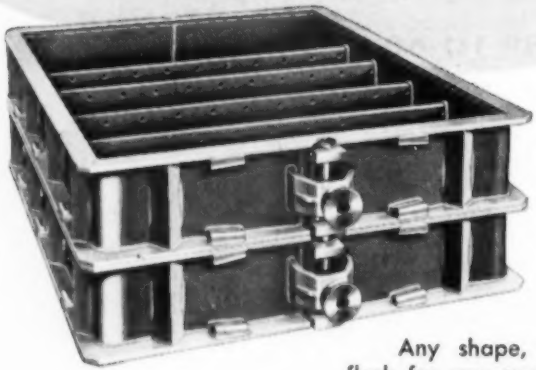
BS&B's Exacting Workmanship Assures Accurate, Reliable Performance

Why take chances? Inexperienced, haphazard methods of flask manufacture can cost you money, waste time, create trouble.

Black, Sivalls & Bryson pioneered the development of welded steel foundry flasks. B S & B originated the steel-bushed flask. Foundrymen of long experience make B S & B flasks. Craftsmen employing the most modern machines and techniques carry out your orders. All types and sizes can be fabricated in the vast B S & B plant. Yet these great advantages cost you no more.

In these days of delay, you'll be pleased with the speed that B S & B fills your order. Write or wire today for full information. B S & B engineers and planners will be happy to help you with your problems.

BLACK, SIVALLS & BRYSON, INC.
Special Products Division
Power and Light Building Kansas City 6, Mo.



Any shape, any size flask for any purpose . . . built to your order by men who know the foundry!

AUTHORIZED BS&B DISTRIBUTOR

ORDER TODAY!
GET GOOD DELIVE
Distributors All Over th
Nation Ready to Serve Y

BIRMINGHAM, ALA.
Foundry Service Co.

BOSTON, MASS.
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TORONTO, CAN.
Canadian Foundry Sup. & Equip., Ltd.

In Booth 748 at the Foundry Show

CP super cycle

HEAVY DUTY GRINDER

The CP Super Cycle Grinder has the lowest ratio of motor weight to horsepower ever built into a portable electric tool.

There is no speed sag when the operator bears down. Operating speed remains constant during the life of the tool. Abrasive wheels always run at the most efficient speed, giving maximum output per man-hour.

CP Super Cycles are easier to handle, more quickly located on work and less tiring to hold, than any other type of electric tools. Maintenance is remarkably low. Squirrel cage induction type motor has no brushes to replace, no armatures to burn out.

ALSO IN BOOTH 748

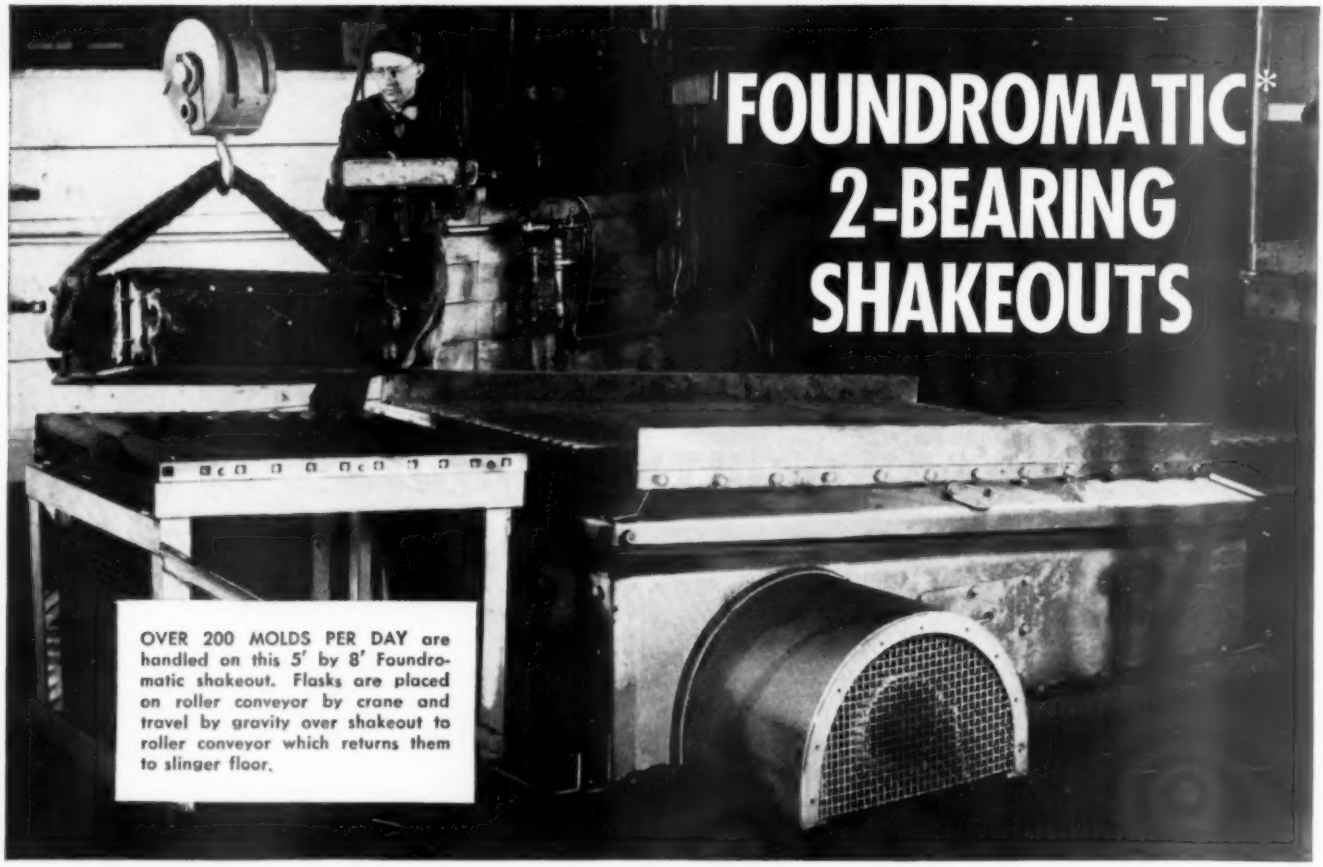
- CP Pneumatic Floor Rammers
- CP Pneumatic Bench Rammers
- CP Core Knock-Out Machine and other foundry equipment

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

ELECTRIC TOOLS • AIR COMPRESSORS • PNEUMATIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

NOW... in Stock



OVER 200 MOLDS PER DAY are handled on this 5′ by 8′ Foundromatic shakeout. Flasks are placed on roller conveyor by crane and travel by gravity over shakeout to roller conveyor which returns them to slinger floor.

A NUMBER of Foundromatic 2-bearing shakeouts, complete with motors and drives are now available in the following sizes: 4′ by 6′ Capacity 4 tons—5′ by 8′ Capacity 7½ tons — 6′ by 8′ Capacity 18 tons — and 8′ by 10′ Capacity 25 tons. These rugged, heavy duty units increase production . . . reduce flask maintenance . . . improve foundry working conditions.

And you take no chances when you specify Allis-Chalmers . . . for all A-C foundry equipment was developed and tested in its *own* foundries . . . designed to do its job right, with a minimum of expense. Consult Allis-Chalmers now about mechanized equipment for *your* foundry. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

THESE 7 FOUNDROMATIC FEATURES GUARANTEE LONG, TROUBLE-FREE SERVICE

1. Body and shakeout deck are "all welded" . . . then stress relieved before machining for uniform strength.
2. Floating shakeout body is supported by resilient springs. No objectionable vibration can be transmitted to building.
3. Eccentric shaft produces effective vibratory motion. Castings and molds are freed in only a fraction of the time required with other methods.
4. Balance wheel and driven sheave are integrally constructed . . . no extra cost for sheave and flask breakage is minimized.
5. Entire weight of body and mold is carried by support springs. Bearings are required only to take care of centrifugal force of mechanism, resulting in longer bearing life.
6. Pivoted motor base maintains uniform V-belt tension . . . increases belt life.
7. No operating adjustments. Vibrating motion is positive and uniform up to maximum capacity. Large or small loads can be handled *without adjustment of any kind.*

SEND FOR NEW BULLETIN
07B6092A, "Foundry Mechanization" —for information on the entire Allis-Chalmers line of foundry equipment.

CUPOLA BLOWERS
All practical sizes. These units can be equipped with air weight control for better cupola economy. Request Bulletin 16B6048A.

COMPLETE A-C SCREEN LINE
includes *Low-Head, Aero-Vibe, Ripl-Flo* and *Utah* electric screens for every foundry screening job.

REGULEX* CONTROL
for arc furnaces makes possible lower cost melts by raising and lowering electrodes in response to changing furnace conditions.

*Allis-Chalmers Trademark

A 2321

ALLIS·CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

A CENTURY OF SERVICE to Industry THAT MADE America Great

Linbond

IT'S CLEAN

Clean enough to meet production schedules, clean to work with, clean for the core-blowing machines.

IT'S STRONG

Strong enough to do a tight job of bonding, tough (without brittleness) with a wide margin of more-than-needed strength.

IT'S FAST

Fast baking in a normal oven, fast to reach top strength, instantly responsive to accurately controlled temperatures and time factors.

LINBOND gives you these three "Foundry Musts". Offered in several grades to meet your foundry needs. Bright in color, low in the hard-to-take fumes, foundrymen like Linbond. Let us send you a sample large enough to make up five or six hundred pounds of sand. Write to us today!

Linbond
CORE OIL

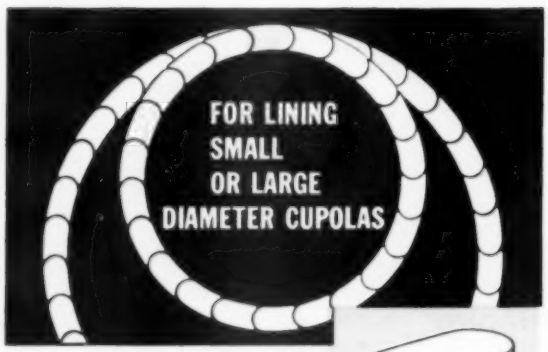
UNITED OIL MFG. CO.

1429 WALNUT STREET, ERIE, PA.

announcing

Universal Cupola Blocks

PATENT APPLIED FOR



For 6-inch linings
Shape No. 602

For 9-inch linings
Shape No. 605

For 4½-inch linings
Shape No. 603

Cupolas of any diameter—from less than two feet to eight feet or more—can be fitted with one shape of H-W Universal Cupola Blocks. This is made possible by the fitted-curve of the blocks, which maintains complete contact over the entire end surfaces of adjacent blocks, regardless of the diameter of the circle. Thus, only one size block need be carried in stock for a given thickness of lining, for all sizes of cupolas. They can be fitted perfectly into stacks that are somewhat out of round. They are laid up quickly, are very easy to handle, and make a strong, tight joint.

The utmost care is used in the manufacture of Harbison-Walker Universal Cupola Blocks. Clays are carefully selected and accurately proportioned to make the refractory best suited for each particular service condition. Three sizes of Harbison-Walker Universal Cupola Blocks are offered to meet your requirements for linings of various thicknesses. Send for new bulletin on Harbison-Walker Universal Cupola Blocks.

TRADE MARK
REG U S PAT OFF

arbison · alker

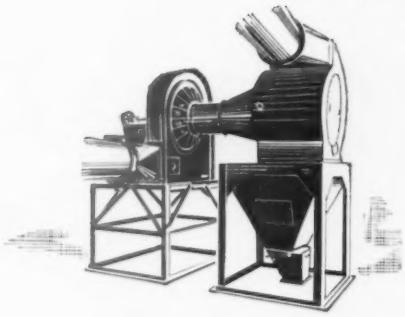
REFRACTORIES COMPANY *and Subsidiaries*

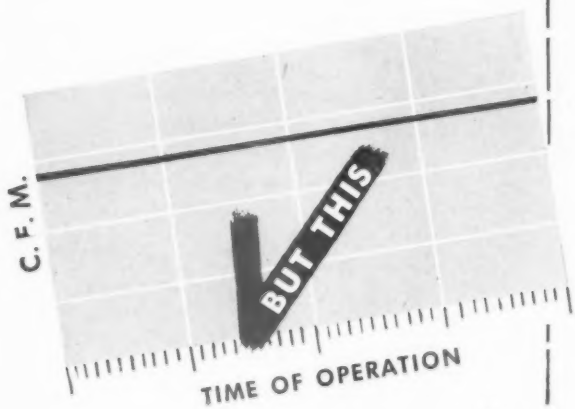
GENERAL OFFICES · PITTSBURGH 22, PA.

WORLD'S LARGEST PRODUCER OF REFRACTORIES

T

Continuous dust control demands constant air volume





Roto-Clone's uniform air delivery assures constant effective control at dust source

THE two charts at left tell an important story. The one above shows how rapidly air volume declines as ordinary type collectors become clogged with dust. Result—constantly varying exhaust volume with parallel variations in effectiveness of control at point of dust generation.

Now examine the chart below. This is a Roto-Clone* at work. Constant air volume is exhausted hour after hour, day in and day out. Continuous high efficiency dust collection is assured without a minute's time out for unit maintenance.

The Roto-Clone method of dust control applies centrifugal and dynamic forces in combination to remove the dust particles from the air stream. There are no collecting elements to clog or clean. Dust is discharged automatically for easy removal without interference to operation.

If you want to put dust control on a continuous high efficiency basis, you will want to put Roto-Clone with its small space requirements on the job. There's a type and size for every service. For complete information, contact your local AAF representative or write direct for copy of Bulletin No. 270-A.

**Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precicipitator types.*

AMERICAN AIR FILTER CO., INC.
266 Central Avenue, Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

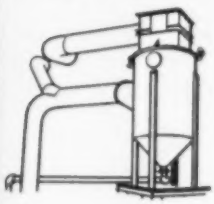
AAF

ROTO-CLONE®
DUST CONTROL EQUIPMENT

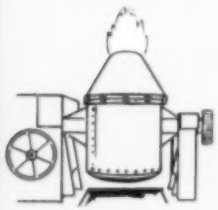
MANUFACTURERS' ASSOCIATION INC. FOUNDRY EQUIPMENT

Whiting Designs and Builds

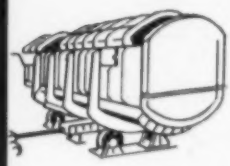
DUST SUPPRESSORS



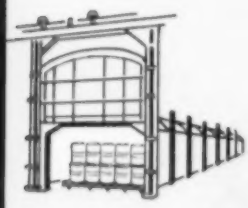
CONVERTERS



CRADLE FURNACES



ANNEALING OVENS



PROFITABLE foundry operation demands efficient materials handling, charging, melting, and metal distribution.

In those operations Whiting engineers are pre-eminent . . . their practical knowledge and long experience enable them to devise methods and recommend equipment that reduces cost and gives closer metallurgical control.

Whiting engineers welcome the opportunity to work on your problems. Whiting Corporation, 15607 Lathrop Ave., Harvey, Illinois.

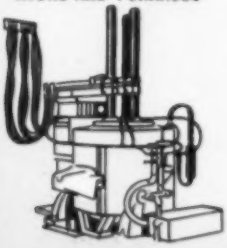
WHITING
CORPORATION
15607 Lathrop Avenue, Harvey, Illinois

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York, N. Y.

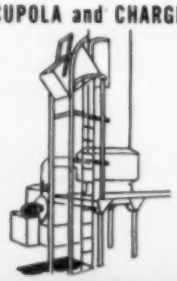
MAKE-UP. This materials yard is served by two Whiting Cranes. Coke and stone hopper and iron loading platform are in the right foreground.

CHARGING. Whiting supplies every kind of charging equipment from simple skip hoists to all types of crane chargers.

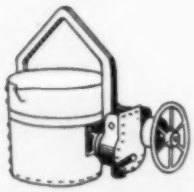
HYDRO-ARC FURNACES



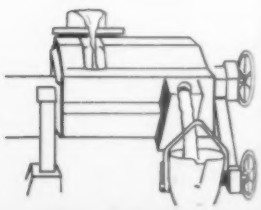
CUPOLA and CHARGER



LADLES



MIXING LADLES



Complete Systems

FOR MATERIALS HANDLING, CHARGING, MELTING, METAL DISTRIBUTION

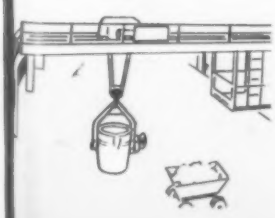
DISTRIBUTION. Whiting Pouring Systems include light cranes, monorails, ladle handlers, and ladles for conveying hot metal quickly and safely to the molds.

MELTING. This Duplexing System consists of a Whiting Cupola and a Whiting Air Furnace. We also make converters, electric furnaces, cradle furnaces, rotary furnaces, heated metal mixers, reservoir, and U-ladles.

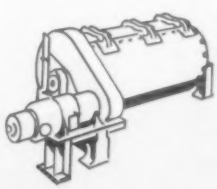
DUST SUPPRESSION. Whiting Hydro-Clones provide wet collection of foundry dusts, converting them to harmless, easily disposable sludge. Here a Hydro-Clone Unit is directly connected with two Whiting Tumbling Mills.

POURING. Whiting Ladles and Ladle Handlers are the engineering result of years of practical experience in foundry operation. They are designed for greatest pouring ease, safety, long life, and trouble-free operation.

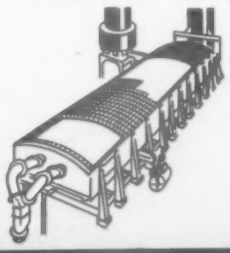
CRANES



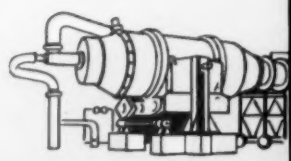
TUMBLERS



DUPLEXING SYSTEMS



ROTARY FURNACES

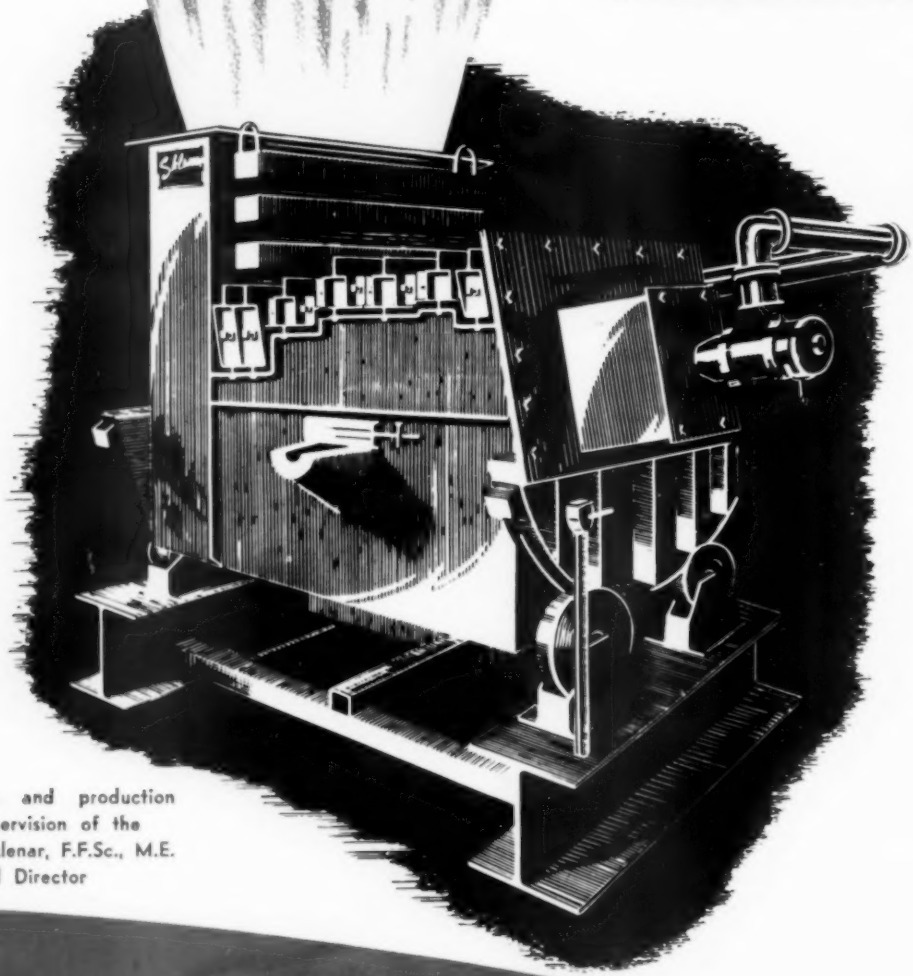


THE ORIGINAL

Sklenar

NEW IMPROVED REVERBERATORY FURNACES

The Modern Method of Melting Metals



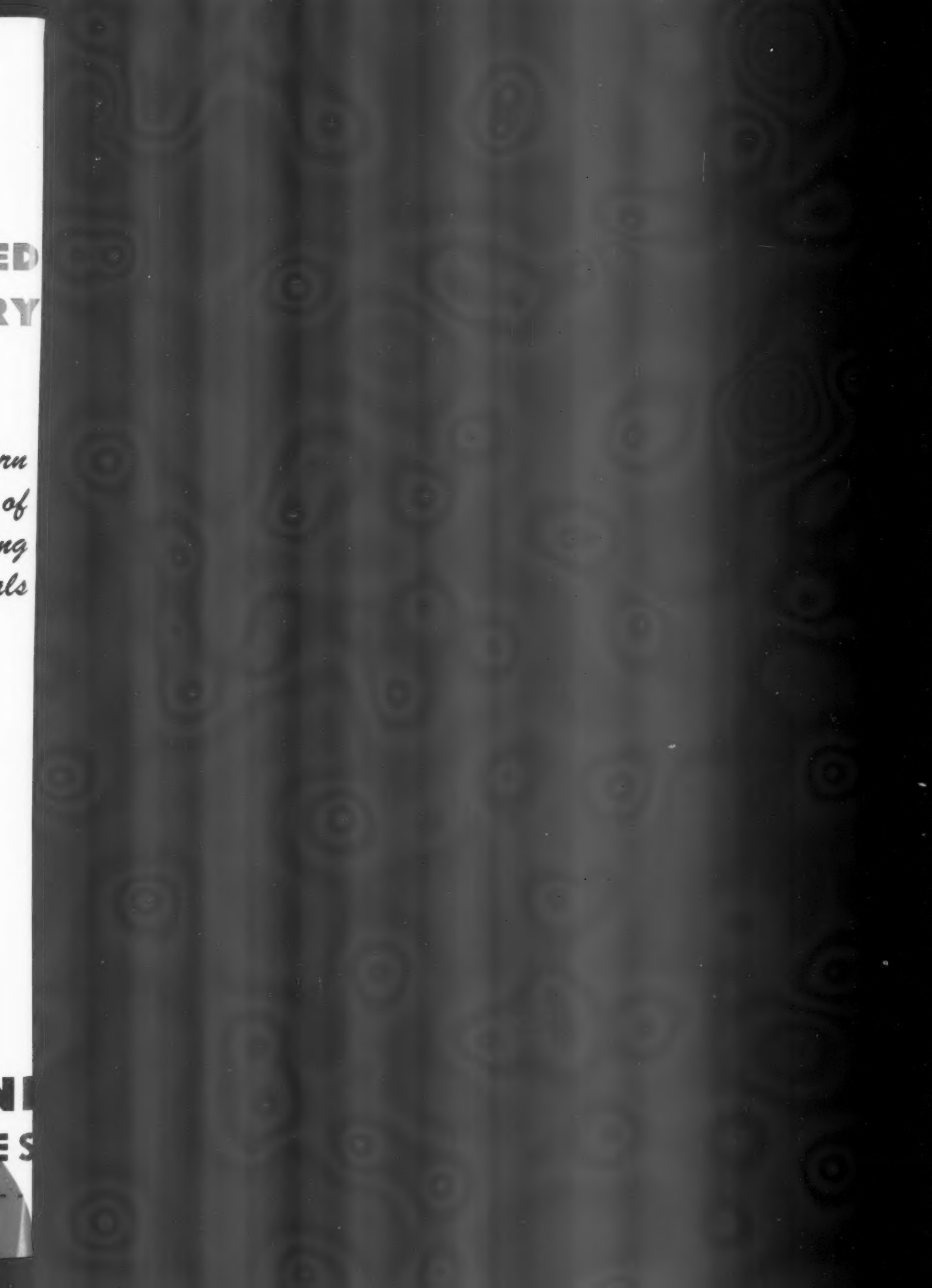
All specifications and production under the supervision of the inventor, W. F. Sklenar, F.F.Sc., M.E. Technical Director

Patented, Patent Pending and Patents Applied for

SKLENAR FURNACE AN

WILSON INDUSTRIES

38 MEMORIAL DRIVE- - - - -



M
N
C

. . . Maintenance Economy means

COMPARISON OF COSTS
(RED BRASS)

	SKLENAR	COST	CRUCIBLE TILT	COST
Total weight melted	259,270 lbs.		259,270 lbs.	
Number of heats	432			
Total hours labor (maint.)	26	26.52	64	65.28
Number Crucibles used (#120)			8	176.00
Fire brick	78	15.60		
Cement used	100 lbs.	8.90	400 lbs.	35.60
Fire clay used	400 lbs.	12.00	600 lbs.	18.00
Total hours labor daily for preparation	None		172 hrs.	175.44
Time of heats for melt	17 min. (600 lbs.)		40-50 min. (360 lbs)	
Total Maintenance Cost		$63.02		$470.32

GREATER PROFITS

Alert foundrymen find the NEW IMPROVED SKLENAR REVERBERATORY FURNACE a boon in reducing melting costs . . . in increasing production of superior metals. The SKLENAR is the ONLY furnace that gives perfect combustion . . . perfect atmosphere control. Maintenance costs minimized; producible tonnage maximized. Write for our descriptive circular F-1 for complete details and specifications.

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Critically chosen | from world's largest bentonite deposits

With a keen awareness of present and potential industrial demands, we have expanded our facilities at Aladdin, Wyoming, where we are processing the finest foundry bentonite available from our Belle Fourche, South Dakota deposits. This output, combined with that of our Osage, Wyoming, plant assures unlimited quantities and prompt shipment of "National" bentonite. Skilled technicians exercise strict laboratory control over raw materials critically chosen from the world's largest bentonite deposits. This is assurance of reliable quality in every pound.

baroid SALES DIVISION
NATIONAL LEAD COMPANY

BENTONITE SALES OFFICE: RAILWAY EXCHANGE BUILDING, CHICAGO 4, ILL.

When You Need VANADIUM

Product and Analysis	Form and Packaging	Uses
Ferrovanadium **High-Speed Grade** Vanadium—50 to 55% Silicon —1.50% max. Carbon —0.20% max.	Lump (10 lb. x down) and crushed (2 in. x down, and 1 in. x down). Packed in special containers.	Production of tool steels, engineering steels, high-strength structural steels, non-aging rimming steels, and special wear-resistant cast irons. Frequently used in combination with other alloying elements.
Special Grade Vanadium—50 to 55% Silicon —4.00% max. Carbon —1.00% max.	Crushed (2 in. x down, 1 in. x down, and 20 mesh x down). Packed in special containers.	
Open-Hearth Grade Vanadium—50 to 55% Silicon —8.00% max. Carbon —3.00% max.	Lump (10 lb. x down) and crushed (2 in. x down, 1 in. x down, ¼ in. x down, and 65 mesh x down). Packed in special containers.	
Vanadium Oxide (Fused) Vanadium Oxide (V_2O_5)—86 to 89% Sodium Oxide (Na_2O) —10% approx Calcium Oxide (CaO) — 2% approx.	Black flaky material. Packed in paper-lined burlap bags containing about 60 pounds net.	Direct reduction in steelmaking furnaces, as in production of tool steels.
Vanadium Oxide (Red Cake) Vanadium Oxide (V_2O_5)—85% approx. Sodium Oxide (Na_2O) — 9% approx. Water (H_2O) —2.5% approx.	Red sand-like material. Packed in paper-lined burlap bags containing about 60 pounds net.	Source of vanadium oxide, catalyst for sulphuric acid manufacture, and for organic synthetic reactions. Color constituent in glass and ceramic glazes. Drier in paints and inks.
Vanadium Oxide (High Purity) Vanadium Oxide (V_2O_5)—99% approx.	Tan crystalline material.	Chemical for laboratory research.
Ammonium Metavanadate Ammonium Metavanadate (NH_4VO_3)—99% min.	White crystalline powder. Packed in 13-gallon capacity fiberboard drums.	Source of pure vanadium compounds used principally as catalysts. Intermediate in manufacture of vanadium compounds used for coloring ceramic glazes and glass, and for paint and ink driers.

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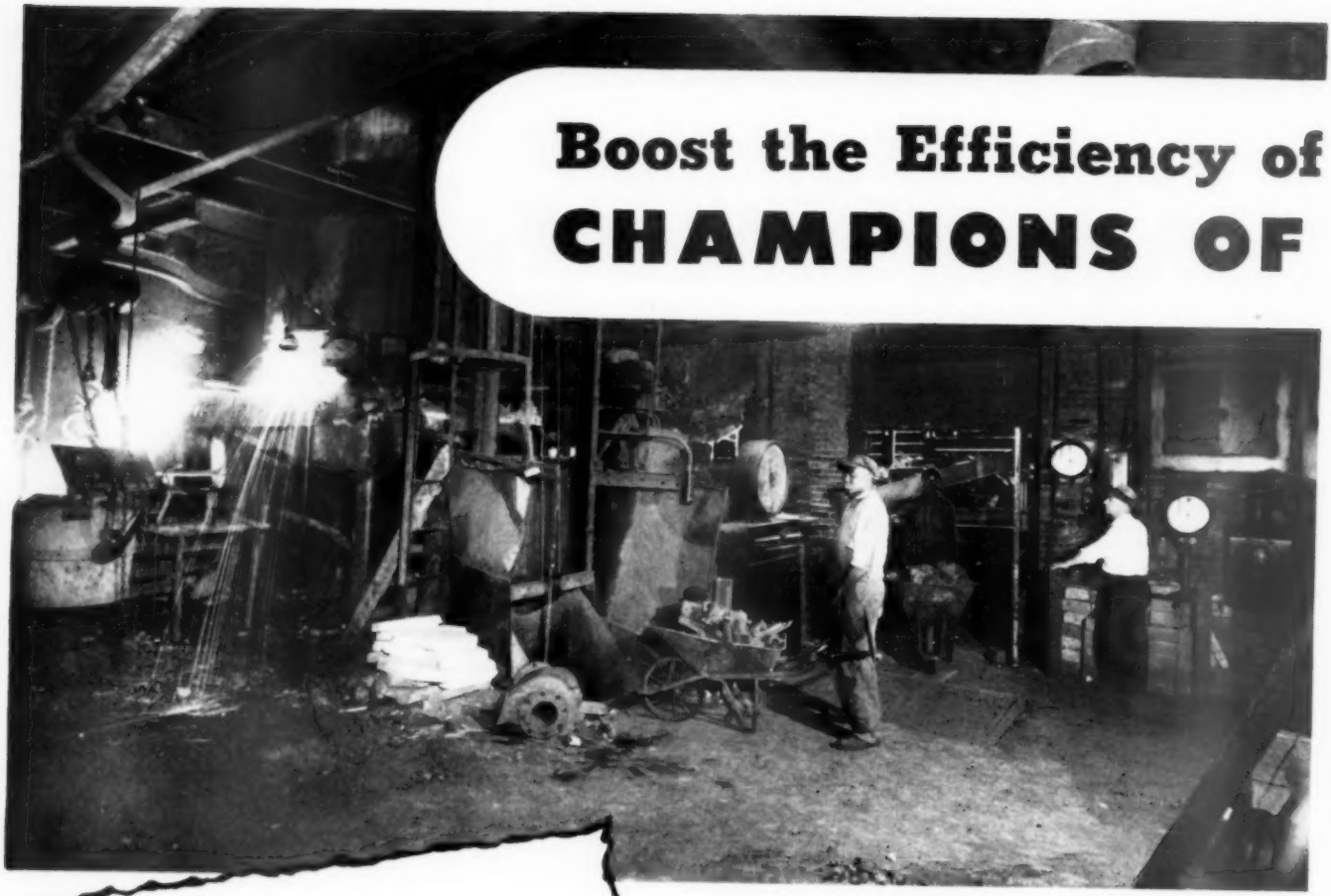
Ferro-Alloys and Metals

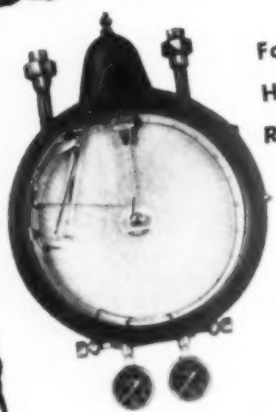
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Turn in your scrap promptly and help increase steel production

Boost the Efficiency of CHAMPIONS OF



Foxboro Air-Weight Controller and Wind-Box Pressure Recorder improve operations at Forest City Foundries Co., Cleveland, Ohio. Entire installation requires but a few hours work by an experienced pipefitter.



For Uniformily Hotter Pours Regardless of Weather

FOXBORO AIR-WEIGHT CONTROLLER

Installed on your present blower, whatever the make or type, this exclusive Foxboro development will correctly control the blast (by weight of air instead of volume); properly compensate for varying weather conditions, and make every day a good pouring day.

Over a thousand installations in leading foundries everywhere. Results reported include: better and more uniform quality, fewer rejects, less pigging, lower fuel consumption, greater output and smoother operation.

For a Closer Check of Cupola Conditions

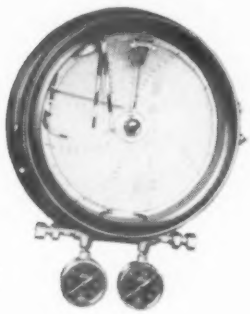
FOXBORO WIND-BOX PRESSURE RECORDER

With this simple, sturdily-made instrument, cupola operators can keep closer tabs on operating conditions to make adjustments, if necessary, before conditions become critical. It will show up any restriction to the blast such as "arching" of the charge, which interferes with proper melting.

RECORDING • CONTROLLING • INDICATING

Your Foundry with these BETTER CONTROL

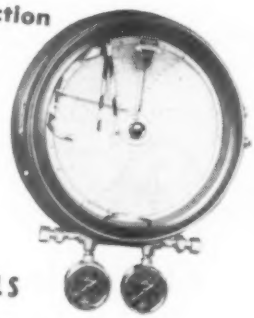
For Keeping Core-Ovens At Optimum Temperatures



FOXBORO CORE-OVEN CONTROLLER

The instrument shown above is widely used for controlling temperatures in core ovens. It is either air-operated, as shown, or electrically (Rotax) operated. Both types provide a continuous, dependable record.

For Higher Production Better Quality In Plating



FOXBORO PLATING CONTROLS

These dependable temperature controllers (filled system type) maintain constant temperature for all types of metal plating . . . operating either heating systems or heating and cooling systems. Available for any requirement . . . on-off and proportional types; indicating or recording; pneumatic or electrical (Rotax) operation.

For Better Control of Pouring Temperatures

New FOXBORO DYNALOG ELECTRONIC TEMPERATURE INDICATOR

This unique instrument provides almost instantaneous readings and high accuracy in the measurement of non-ferrous pouring temperatures. Its fast-measuring action, providing full scale pointer travel in 5 seconds or less, cuts down the time of thermocouple immersion and reduces thermocouple replacements.

Its simplified mechanism, the only one that takes full advantage of electronic circuits, results in a much longer instrument life, a higher sustained accuracy, and virtual freedom from maintenance. (A large, open-face calibrated dial makes reading easy and precise.)

• • •

To take full advantage of the superior performance of this instrument, Foxboro offers specially designed thermocouples for molten aluminum and brass alloys.

OTHER FOXBORO CONTROLLERS

available for annealing temperatures
normalizing temperatures
air-system pressures

Write for complete details on Foxboro Control Systems developed specifically for Foundries. The Foxboro Company, 32 Neponset Ave., Foxboro, Mass., U. S. A.

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The COMFORTABLE Answer to High Impact Hazards—

IMPROVED AO FOUNDRY GOGGLES

In safety goggles, protection *alone* isn't enough! That's why AO makes the NFA Foundry Goggle in two sizes to fit large faces and small . . . builds in a pliable corduroy binding that softly "drapes" the entire edge of a genuine horsehide leather mask that's soft in itself. Combined with a one-piece, easily adjustable headband, the result is a snug, safe, non-slip fit. Fogging is no problem — wire screen ventilators let air *in* — keep sparks and flying objects *out.* For operations such as melting, pouring, chipping, grinding, babbitting, hand tool and machine work. Your choice of 50 mm. Super Armorplate or 6 Curve Super Armorplate clear or Calobar lenses in three shades. Ask your nearest AO Safety Representative.

American Optical COMPANY

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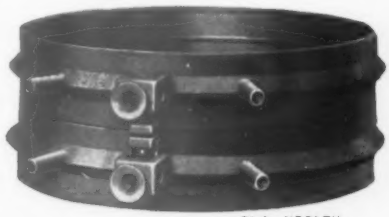
PRESENTING THE *Sterling* LINE OF STEEL FOUNDRY FLASKS

North American foundries . . . more than 4,000 of them . . . have adopted Sterling Steel Flasks for greater efficiency, longer life and more profitable foundry operation. These same foundries continue to specify Sterlings whenever more flasks are needed. That's because Sterlings have the strength and rigidity to resist distortion and to take hard, everyday punishment. Fabricated from special rolled steel channel into one solid, rigid piece, Sterling Flasks are capable of withstanding tremendous pressures. They retain their rigidity and accuracy over a long period of years. Available in a variety of styles and shapes. Write for your copy of Sterling Catalog No. 59.

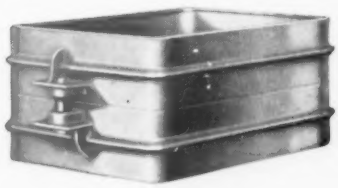
Style "GGX"
with Single Pin Lugs and
Two-Man Lift Handles



Style "BBLT"
with Trunnions and
Two-Man Lift Handles

Style "A"
with Double Pin Lugs
for Stack Molding

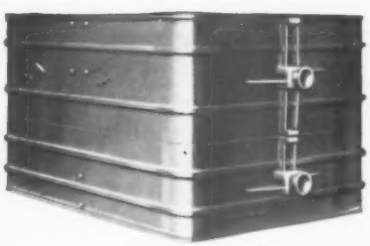
Style "H"
with Pin Lugs
Welded on Sides



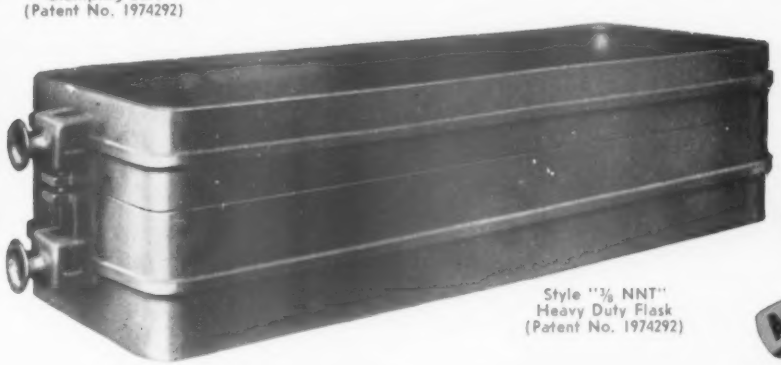
Style "S"
with Pin Lugs and
Handles Combined

Style "⅜ NT-NNT"
with Heavy Duty Clamps and
Clamping Bars
(Patent No. 1974292)

Style "LL"
with Angle Reinforcement
and Two-Man Lift Handles



Style "⅜ NT-NNT"
Heavy Duty Flask
(Patent No. 1974292)



Style "⅜ NNT"
Heavy Duty Flask
(Patent No. 1974292)

STERLING WHEELBARROW CO.

MILWAUKEE 14, WISCONSIN, U. S. A.

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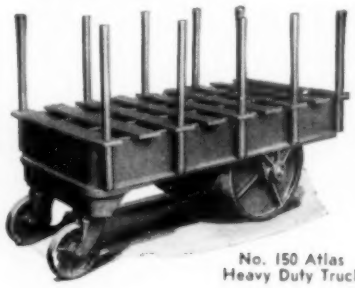
In addition to Steel Flasks, Sterling offers a complete line of Flask accessories and a variety of foundry equipment. Custom-built for heavy duty foundry service and high-speed production schedules, every piece of equipment is backed by the well-known Sterling reputation for correct design and excellent workmanship. The Company has always maintained a policy of fabricating to high quality standards. Consult Sterling the next time you require foundry equipment. The Sterling branch office near you will gladly give you information and estimates — or write to factory.

Heavy Duty Cart with "3-Point" Landing

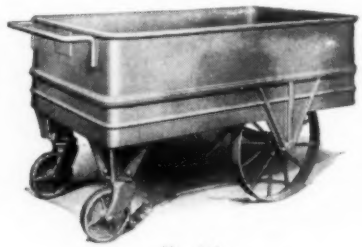
No. 116-A Heavy Duty Wheelbarrow

No. 50 Slag Buggy

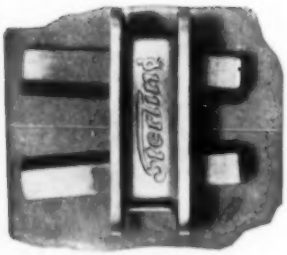
No. 110-A Core Truck



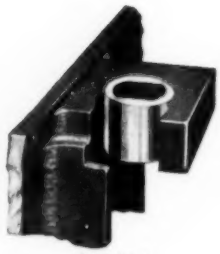
No. 150 Atlas Heavy Duty Truck



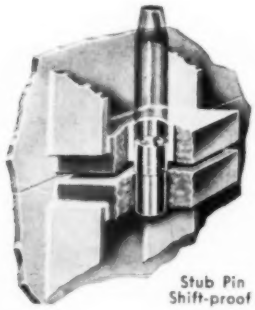
No. 160 Heavy Duty Casting Truck



Sterling Flask Clamp

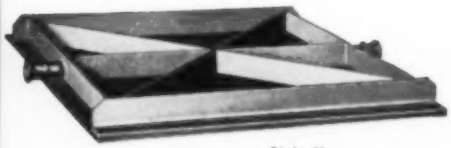


Standard Hardened Steel Bushing



Stub Pin Shift-proof

Caster with Pneumatic Tire

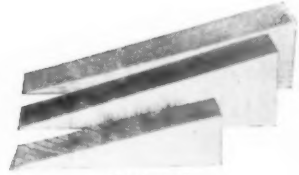


Style X Bottom Board with Trunnions

Style X Core Plate

Standard Type "S" Flask Pin

No. 47 Casting Cart



Hardwood Foundry Wedges

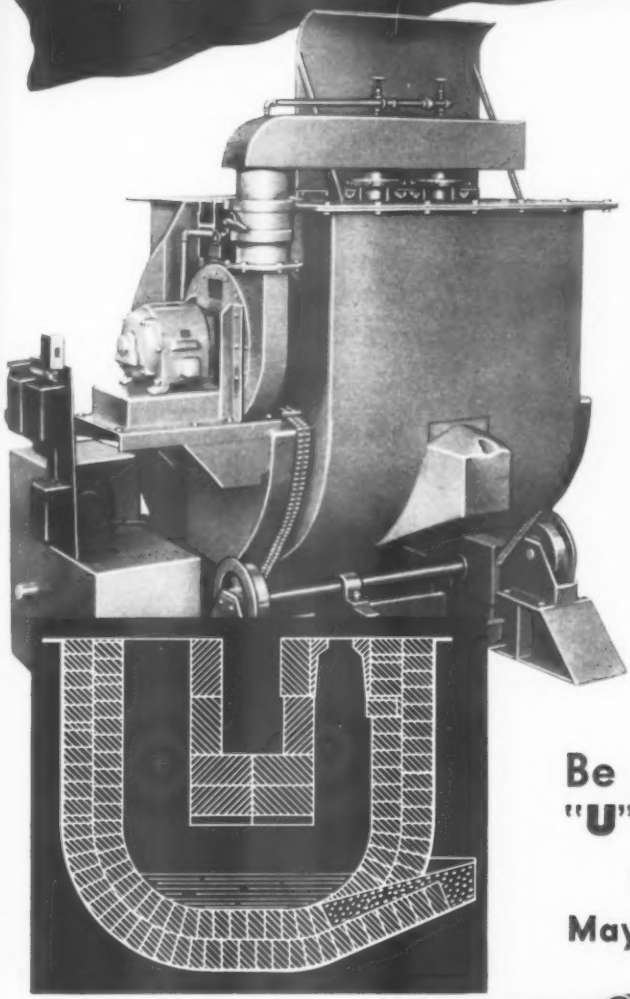
STERLING WHEELBARROW CO.

MILWAUKEE 14, WISCONSIN, U. S. A.

Branch Offices: Boston • Buffalo • Chicago • Cleveland • Detroit • New York • Philadelphia • St. Louis

FIRST SHOWING!

The New Stroman "U" Type Reverberatory DIRECT FIRED FURNACE



Again setting the pace in metal melting furnace design, Stroman offers this new "U" Reverberatory that is the fastest and most economical furnace ever built for the melting of iron, iron alloy, ferro-manganese, ferro-silicon, brass, copper, monel, nickel silver, aluminum and other alloys. It may be oil or gas fired and is also available with combination oil-gas burners.

It is so designed that higher temperatures are attainable . . . is easily accessible for charging, pouring, skimming and alloying . . . mechanical tilt **forward and backward** . . . lowest refractory and full costs.

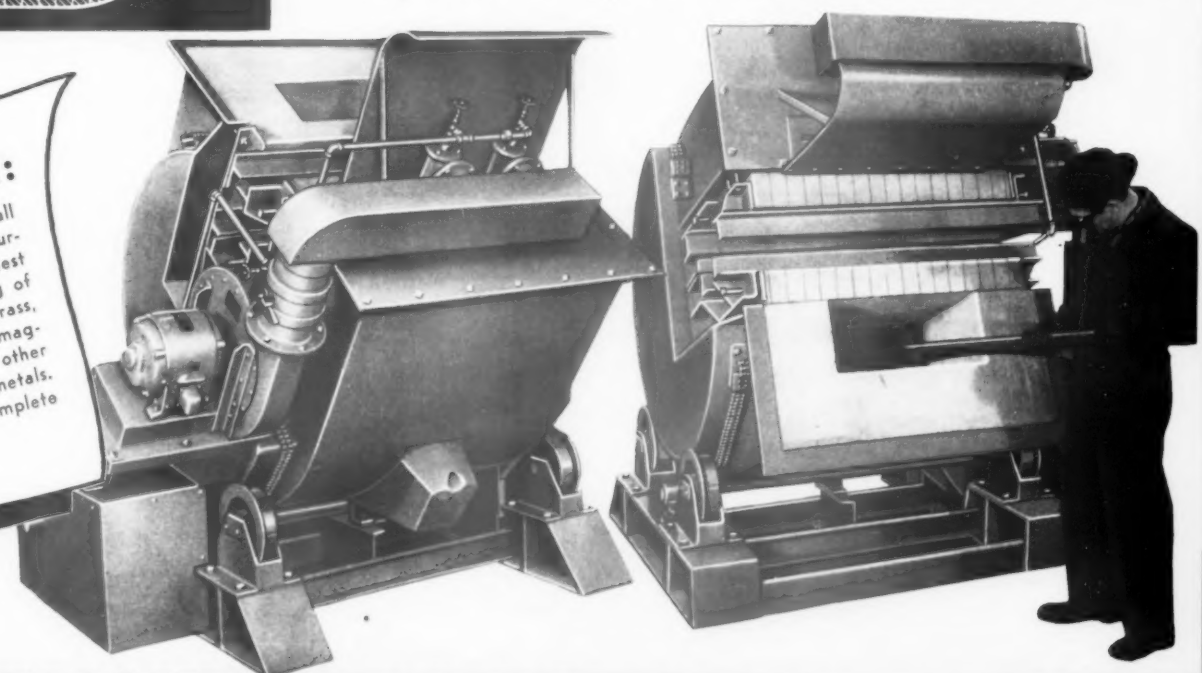
Be sure to see this great new Stroman "U" Furnace at the

1948 Foundry Congress and Show

May 3rd to 7th . . . Booth 1128 . . . In Philadelphia

REMEMBER:

Stroman makes all types and sizes of furnaces for the finest and fastest melting of iron, iron alloys, brass, bronze, aluminum, magnesium and all other non-ferrous metals. Write for complete literature.

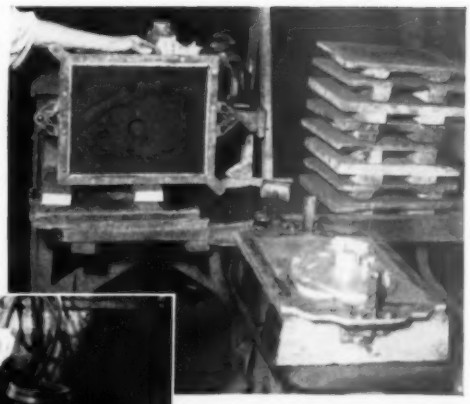


STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

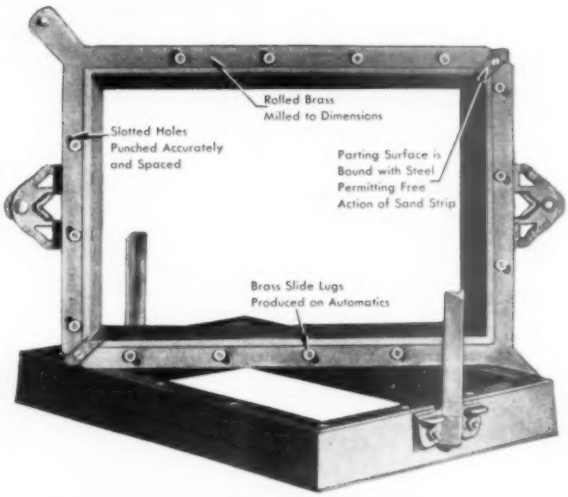
THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

NEW!



foundry flasks

with precision-made 100% machined sand strips . . . another advance by Diamond. *Write for bulletin "F" for complete details.* And note this: we can make prompt delivery!



DIAMOND

Telephone 2553 CLAMP AND FLASK COMPANY Richmond, Indiana

Designers of CORE PLATES, JACKETS, BANDS, FLASKS *since 1889*

GOOD INGOT, AND ALL THIS TOO!

In Federated ingot you get the exact metal you specify, PLUS all these intangible ingredients. These background factors mean service and security . . . they mean that you get *consistently* better ingot to help you do a *consistently* better job.

For any non-ferrous metal—brasses, bronzes, other copper alloys; deoxidizers, hardeners; alloys of aluminum, magnesium, zinc—see Federated first.

Federated
METALS DIVISION

AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.

Federated first in the non ferrous field FMD

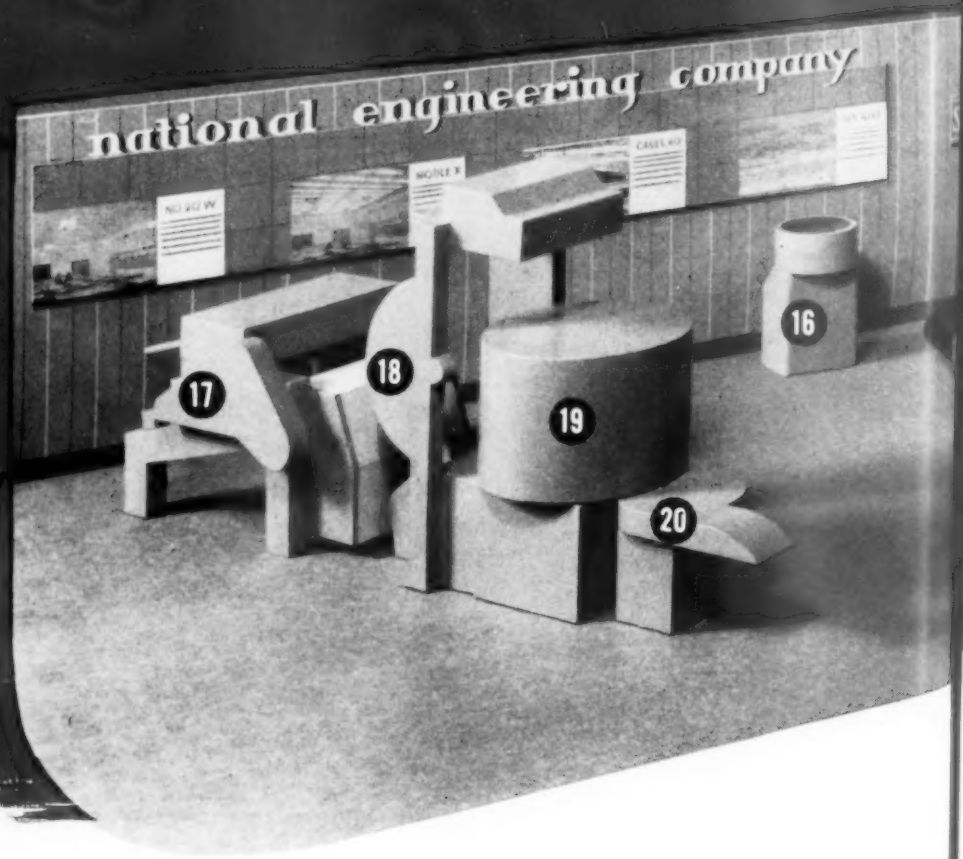
F-CC1f

Be sure to see this Modern-Mechanized SAND HANDLING *Demonstration*

at the

1948 FOUNDRY SHOW

BOOTHS 920 through 924



NATIONAL ENGINEERING COMPANY will present a complete, full scale working demonstration of modern, mechanized sand handling operations at The 1948 Foundry Show. Duplicating actual methods designed for high production sand preparation and handling, this exhibit will show the following sequences:

Molder will place molds on The National Pallet Conveyor . . . molds will then be shaken out on the National-Goodman Shaker Conveyor . . . Sand will be returned to drier, where it will be heated to about 300° . . . then delivered to the Simpson Mixer with Rotary Cooling Hood, and the sand cooled to molding temperature . . . then delivered to the prepared sand hopper. Molders from a high production foundry will make molds on an actual production basis,- demonstrating the advantages of mechanized equipment. We'll be looking for you at Booths 920-924.

Illustrated here is an accurate scale model of the complete operating exhibit which will occupy over 1600 sq. ft. of floor space at the National Engineering Company booths in the Philadelphia Auditorium.

...here are the latest developments you will see in FULL-SCALE OPERATION:

1. NO. 2 SIMPSON INTENSIVE MIXER
2. NATIONAL ROTARY COOLING HOOD
3. NATIONAL AERATOR
4. NATIONAL BUCKET UNLOADER
5. PREPARED SAND HOPPER
6. MOLDING MACHINE
7. NATIONAL PALLET-TYPE MOLD CONVEYOR
8. NATIONAL-GOODMAN SHAKER CONVEYOR
9. BELT CONVEYOR WITH MAGNETIC HEAD PULLEY
10. NATIONAL BUCKET LOADER
11. RECEIVING HOPPER
12. VIBRATING FEEDER
13. NATIONAL SAND DRIER
14. BLOWER SYSTEM
15. EXHAUST SYSTEM
16. NO. 00 SIMPSON INTENSIVE MIXER
17. NATIONAL SCREENING AND SEPARATOR UNIT
18. NATIONAL BUCKET LOADER
19. NO. 1 MODEL "H" SIMPSON INTENSIVE MIXER
20. NATIONAL DISCAERATOR

MANUFACTURERS ASSOCIATION, INC. FOUNDRY EQUIPMENT

NATIONAL *Engineering Company*

608 Machinery Hall Bldg. • Chicago 6, Illinois

Manufacturers and Selling Agents for Continental European Countries — The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia — August's Limited, Halifax, England. For Canada — Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand — Gibson, Battle & Co., Pty., Ltd., Sydney, Australia

Triple

1

WELCOME to PHILADELPHIA!

Fifty-two years ago, Philadelphia was the stage for "opening night" of what since grew to be one of the greatest industrial shows on earth—the American Foundrymen's Association Convention.

Since then, an "all-star cast" has returned four times to Philadelphia for "curtain call".

Again this year, on May 3-7, A.F.A. brings the convention and exposition back from the "road" to its birthplace.

So to foundrymen everywhere, Tabor says, "Welcome to 'Philly'—a familiar landmark"!

REPRESENTATIVES

Snyder Foundry Supply Company, Los Angeles, California; Carl F. Miller & Company, Seattle, Washington; M. W. Warren Coke Company, 1017 Olive St., St. Louis 1, Mo.; E. R. Frost Company, Inc., Minneapolis 14, Minn.

The **TABOR** *Manufacturing Co.*

SINCE **1884** *MANUFACTURERS OF FOUNDRY MOLDING MACHINES*

6225 TACONY STREET • PHILADELPHIA 35, PENNA.

save labor

Welcome from Tabor

2

WELCOME to the TABOR BOOTH!

Another landmark to steer for is the Tabor Booth—#717-721.

On parade for you to see will be our line of molding machines, abrasive cutoffs and other foundry equipment—a 64-year-old "family" with young ideas.

And sharing the spotlight, several brand new machines that will set you to thinking, talking, doing.

Last, but not least, plenty of comfortable settees where "barking dogs" may rest while old acquaintances are renewed and new friendships cemented.

3

WELCOME to the TABOR PLANT!

What better chance than this year for you to visit our plant—so long a part of the "Philadelphia Story".

Come on over into *our* back yard. See where, how and by whom the famous Tabor line is built. Get an idea of what's coming up in the way of new machinery, engineered to meet the fast-stepping needs of you people who cast metals.

We'll be glad to have you! After all, six times out of fifty-two is little enough chance for us to play the gracious host.

. . . buy Tabor

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

Dallett Pneumatic Vibrators

Precision Built to Meet Your Foundry Needs

DALLETT Pneumatic Vibrators are valveless, simple in design, but sturdy in construction. They are engineered for dependability, long life and top performance.

They are made in two series, the "MPV" for Match Plate Foundry work, and the "M" Series for heavy forms, loading hoppers, dust arrestors and for many other heavy duty requirements.

Illustrated is the Dallett "MPV"—7. This series is available in four sizes.

Only One Moving Part

Both Series of Dallett Pneumatic Vibrators have *but one moving part —the piston.* There are no springs to be replaced. Dallett's springless construction means less breakdowns for you, saves costly replacement time and money.

Trouble-free Construction *Means More Production*

Smooth operation and high efficiency are assured in all Dallett Vibrators because of their *precision* construction. All barrels and pistons are carefully heat treated and precision ground. Standardize on Dallett Pneumatic Vibrators for maximum performance.

Send for Bulletin 100

This bulletin fully describes and illustrates Dallett's Line of Pneumatic Tools. For Dallett Forged Products ask for Bulletin #200. Complete Airline Accessories are covered by Bulletin #300.

TOOL MAKERS
PNEUMATIC
DALLETT EQUIPMENT
ACCESSORIES
SINCE 1883

THE DALLETT COMPANY

MASCHER AT LIPPINCOTT STREET, PHILADELPHIA 33, PA.

Manufacturers of Pneumatic Tools and Accessories

DISTRIBUTORS in principal cities throughout the United States, Canada, Europe and South America.

VISIT US AT THE FOUNDRY SHOW—BOOTH 635 EXHIBITION HALL

This Modern David Slays the Giant of Foundry *Waste and Loss!*

When you stop at our booth at the A. F. A. Exhibit in Philadelphia in May, you will see an unromantic grayish powder on exhibition.

Nothing to excite you or provoke admiration in Castflux—but there's power in this inanimate powder. Power to transform foundry operation losses into profits.

Little David slew Goliath, and like David this insignificant looking powder lays low the costly giant of poor grained castings, rejects and miss runs.

When you're at the Convention, we will be glad to show you how Castflux is used on both Blind and Open Risers, as well as in the Ladle.

The facts presented will convince you that Castflux will effect overall savings far—far in excess of its small cost of 6 to 10 cents per ton of metal treated.

A Philadelphia concern, we extend a hearty welcome to you to be with us in May. If you're not coming to the Convention, we will be glad to send you detailed information on Castflux.

At the A. F. A. CONVENTION and EXHIBITION

•BOOTH 321
•AISLE 300

CASTFLUX
TRADE MARK REG.

THE NATIONAL DUAL-PURPOSE FLUX

Sales Agencies in Principal Cities

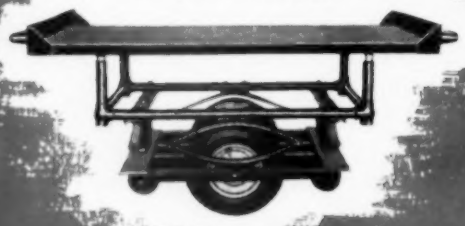
NATIONAL

PIGMENT COMPANY

2115-2117 EAST YORK STREET
PHILADELPHIA 25, PA.

ACCLAIMED! APPROVED! ACCEPTED!

MODEL B-1
Intermediate elliptical springs provide extra cushioning protection. Load capacity, 700 lbs.



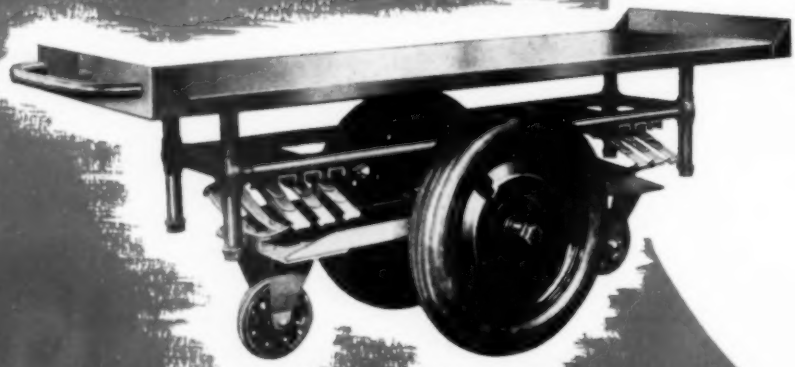
MODEL A-27-J
Elliptical springs and inner coil springs (in the upright supports) assure correct resiliency. Platform, 27″ x 60″. Load capacity, 600 lbs.

PNEUMATIC CORE TRUCKS

Since 1925 foundries have been using CMD PNEUMATIC CORE TRUCKS to speed up the handling of cores and reduce chafing and breakage. In many places costs have been reduced from 50 to 75 per cent.

Write Today

for bulletin describing and illustrating CMD Pneumatic Core Trucks, Core Barrows, Resilient Core Racks, and other foundry specialties.



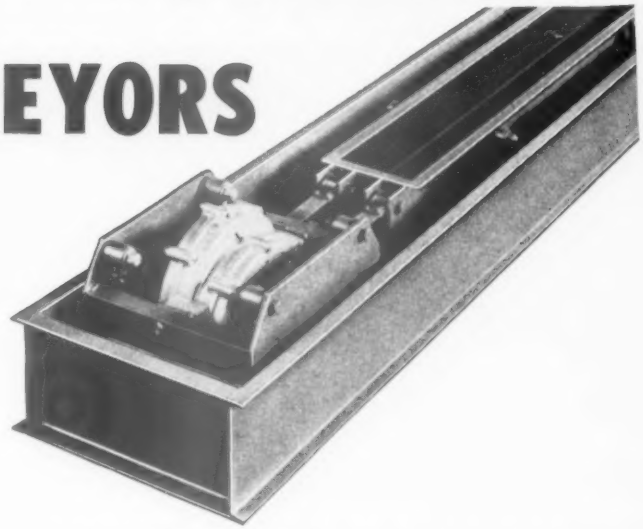
MODEL A-27
For the heaviest loads, this giant carrier is widely used. Heavy-duty elliptical springs and inner coil springs (in the upright supports) quickly absorb shocks that could chafe or break cores. Three sizes: 27″ x 60″, 800 lbs. capacity; 27″ x 72″—1,000 lbs. capacity; and 27″ x 84″—1,200 lbs. capacity.

CMD CORE BARROWS
Have pneumatic tires and inner coil springs in the uprights over the wheels. MODEL C-2 shown here. MODEL C-1 (with one wheel) also available.

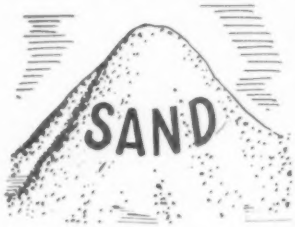
CHICAGO MANUFACTURING AND DISTRIBUTING CO.

1928 WEST 46th STREET CHICAGO 9, ILLINOIS

Questions and Answers about AJAX LO-VEYORS



WHAT MATERIALS CAN BE HANDLED?

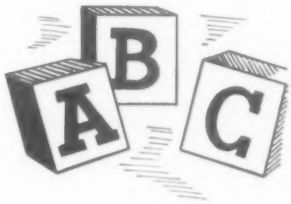


Dry aggregate materials ranging from granular up to 6" lumps such as sand and castings.

IS DUST-TIGHT OPERATION AVAILABLE?

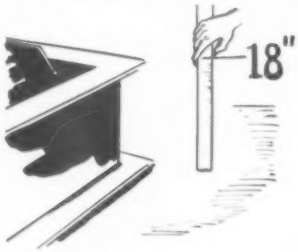
Flat conveyor pans with cover and booted inlets and outlets and also gastight tubular conveyors permit handling materials without contamination or explosion

HOW DOES AJAX REDUCE WEAR?



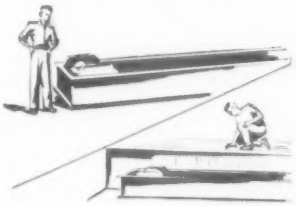
Reciprocating drive unit is completely enclosed. All eccentrics, idler pulleys and exposed bearings are eliminated.

HOW MUCH HEAD ROOM IS REQUIRED?



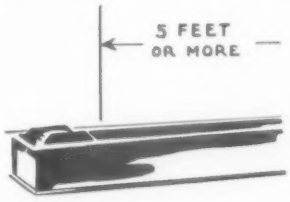
Average overall height is less than 18" except for a short distance where shaker is mounted.

CAN AJAX LO-VEYORS BE INSTALLED ANYWHERE?



They are self-contained units ready to set in place and use. Easily installed on or below floor or suspended from wall or ceiling.

CAN THEY BE USED FOR SHORT AND LONG CARRIES?



Lengths, widths and capacities to suit various materials, plant conditions and requirements of the process.

HOW DO AJAX LO-VEYORS REDUCE COSTS?

They eliminate moving materials by costly nonproductive shovel and wheelbarrow methods.

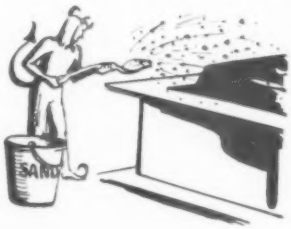
ARE AJAX LO-VEYORS ECONOMICAL?

They are economical to buy, operate and maintain.

•

Write telling us your material handling needs and Ajax engineers will make recommendations.

ARE ABRASIVE CONDITIONS HARMFUL?

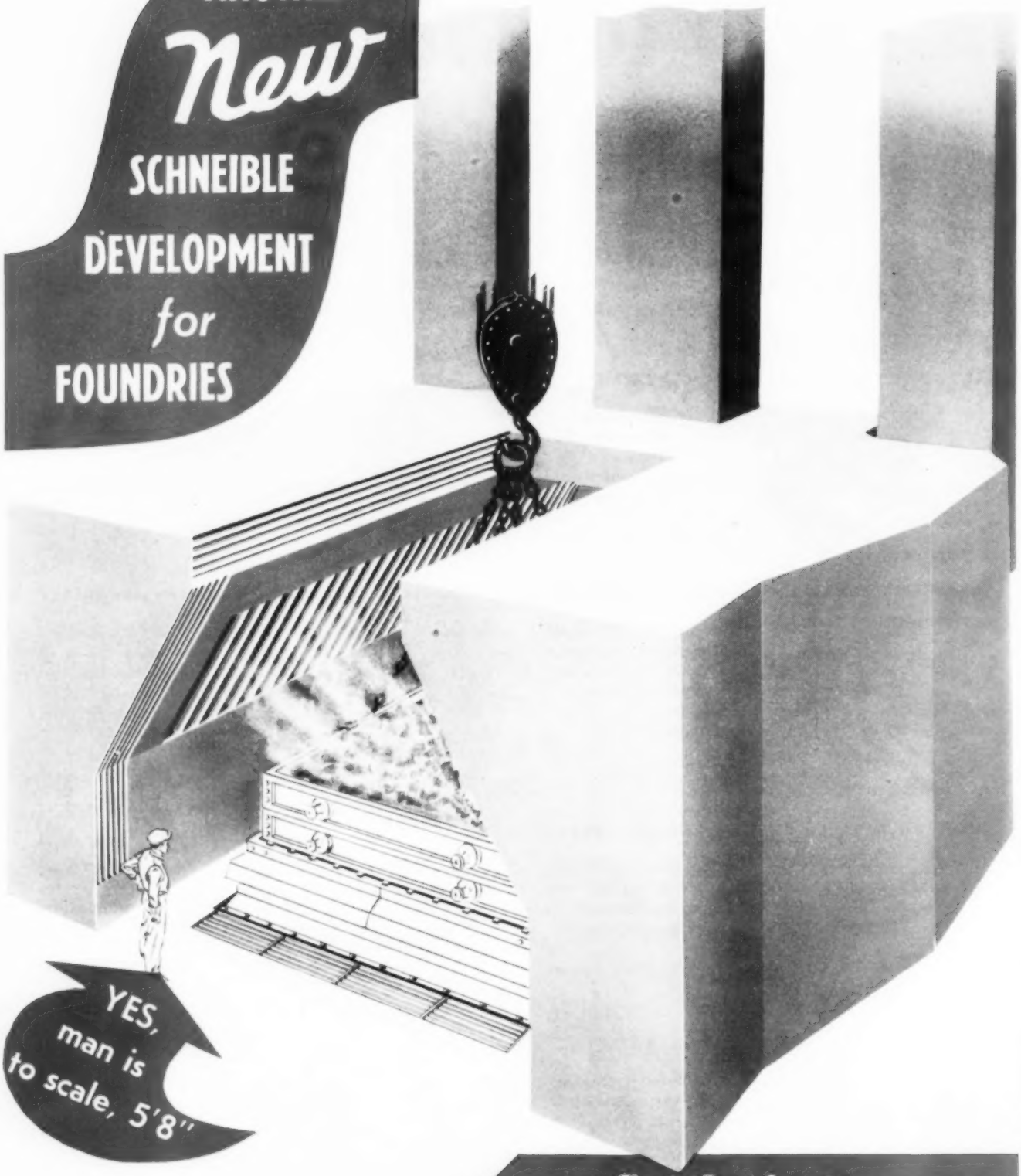


Unaffected by sand and abrasives, they are ideal for foundries, chemical plants, cement mills, etc.

AJAX FLEXIBLE COUPLING CO. INC. WESTFIELD, N. Y.

MAMMOTH UNI-FLO

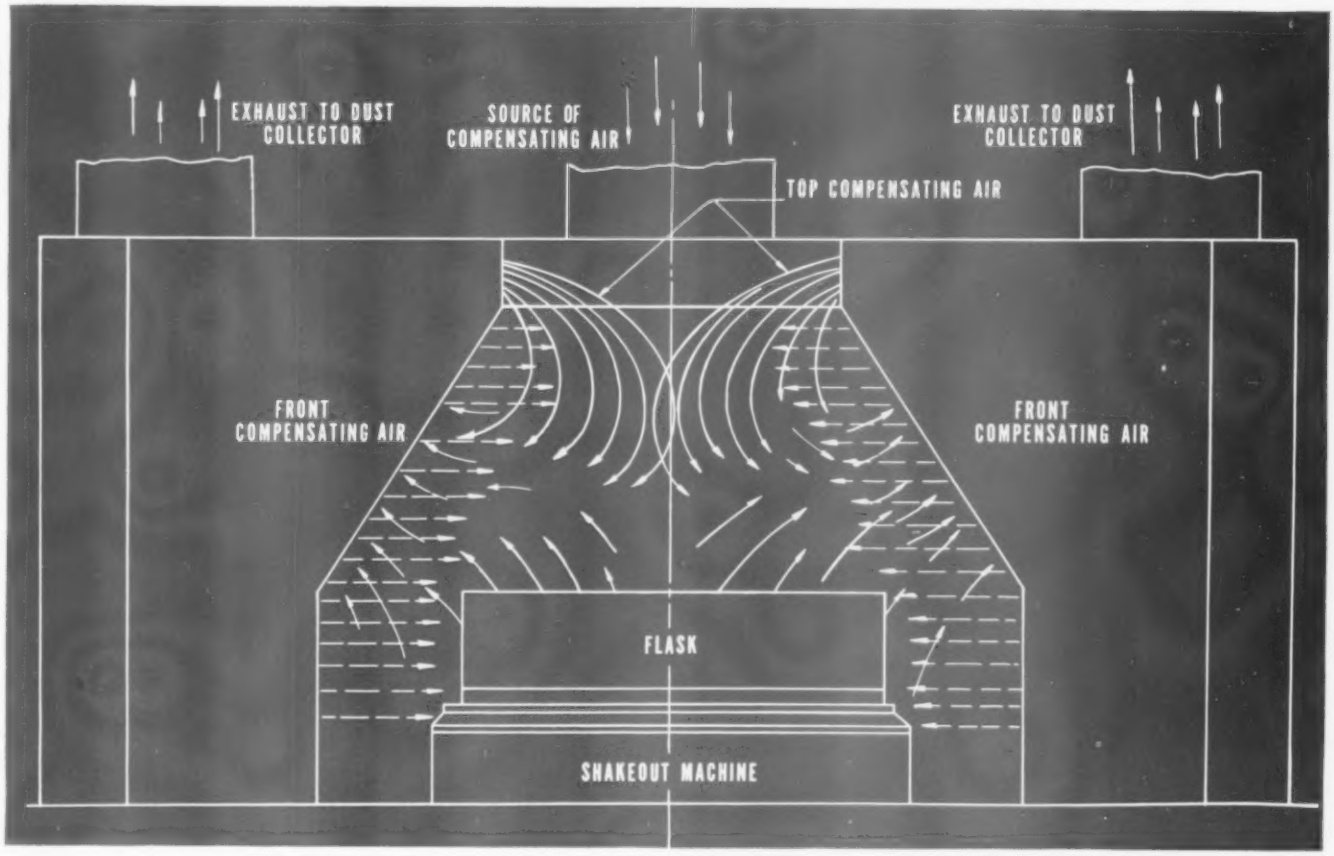
ANOTHER *New* SCHNEIBLE DEVELOPMENT *for* FOUNDRIES



YES, man is to scale, 5'8"

Get the facts at the Foundry Show - Booths 801 and 900

SHAKEOUT BOOTH *with* COMPENSATING AIR SUPPLY



Large shakeouts, long difficult to ventilate, are now completely "blanketed" by this new Schneible Booth. Three sides are closed. A large crane opening is provided. Compensating air blankets all openings. No moving parts — chains are not removed from flasks.

All air contamination arising from shakeout operation is quickly whisked away to Schneible Multi-Wash Dust Collector — heavier particles are settled-out in Schneible Velocitrap, integral part of unit, and returned to shakeout sand conveyor belt.

Compensating air supply, taken from outside building, prevents "robbing" plant of air — reducing heating costs and preventing undesirable airflow pattern in building. Clean air is forced in, picks up its charge of smoke and dust and is exhausted for disposal. The installation shown here uses 120,000 c. f. m. of air, 90,000 c. f. m. of which is from outside building. Initial and operating costs are less than any previous design. (U. S. and foreign patents applied for.)

CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth St. • Detroit 16, Michigan
Engineering Representatives in Principal Cities

SCHNEIBLE

LIQUID-VAPOR INTIMATE CONTACT EQUIPMENT for DUST COLLECTION ABSORPTION CONDENSATION AND TEMPERATURE REDUCTION

WELCOME

Delegates to the
52ND ANNUAL FOUNDRY CONGRESS & FOUNDRY SHOW
are invited to the

GEORGE SALL METALS COMPANY

Suite in the Ritz-Carlton Hotel

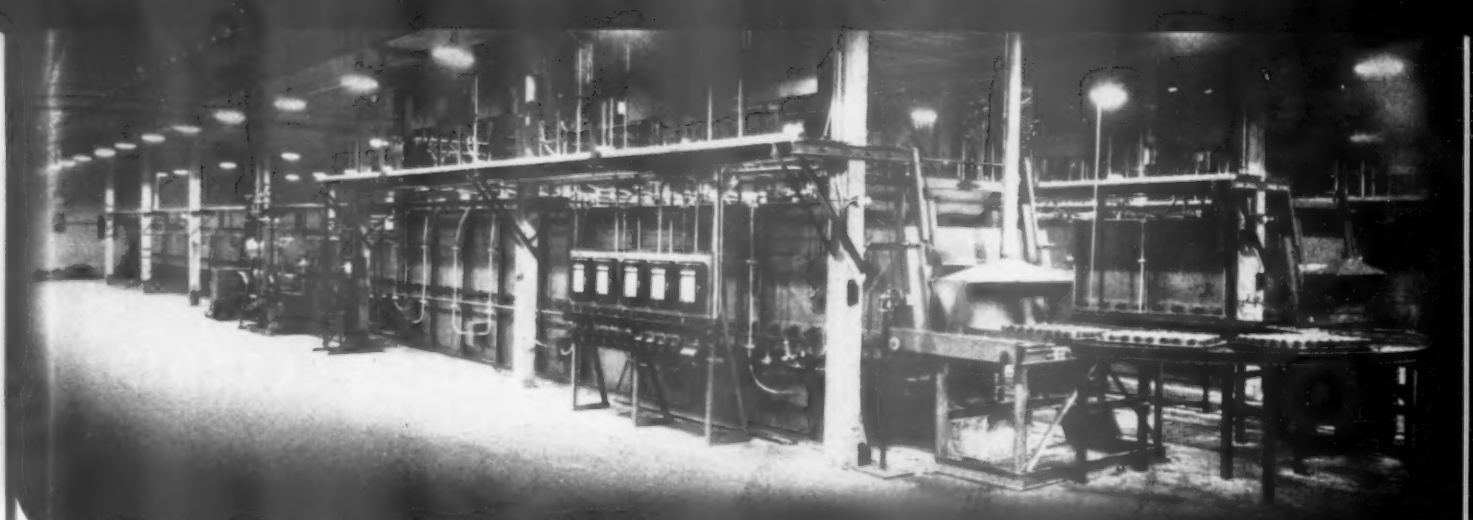
FOR ANY INFORMATION OR HELP

YOU MIGHT NEED TO MAKE YOUR STAY IN PHILADELPHIA A MOST PLEASANT ONE

Photo Courtesy of Convention Bureau of Philadelphia Chamber of Commerce

THE GEORGE SALL METALS CO.

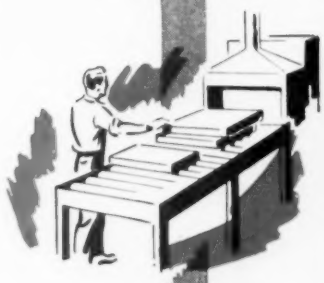
MANUFACTURERS OF ALUMINUM, LEAD and ZINC | JOBBERS OF NON-FERROUS METALS



Typical G-E "Packaged" Process for annealing small assemblies

heating processes * ... completely "packaged"!

EQUIPMENT From start to finish, look to G-E "Packaged" Heating Processes for complete, economical industrial heating. Designed to do the entire job, a G-E "Packaged" Process combines a unit from the outstanding G-E electric furnace line—roller-hearth, mesh-belt, elevator, pit, car-bottom, etc.—with appropriate G-E atmosphere producers, automatic controls, conveyors, and handling equipment. This process "packaging" of G-E equipment assures maximum performance from every component . . . eliminates "misfits" . . . saves you time and money.



ENGINEERING You get the full benefit of G.E.'s 40 years of designing, manufacturing, and applying industrial heating equipment focused on your process. Expert G-E engineers advise and plan with you, in order that you get maximum returns from your investment in G-E "Packaged" Heating Processes.

FIELD SERVICE G.E.'s interest does not stop with the sale of the "packaged" process. A nationwide G-E field service stands ready to supervise your installation, to help solve operating problems, and to perform emergency repairs.

For complete information on G-E "Packaged" Heating Processes, contact the Heating Specialist in the nearest G-E Office. Or, write Dept. 675-176, *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

"Packaged" HEATING PROCESSES

BRAZING
ENAMELING
ANNEALING
HARDENING
CARBURIZING
SINTERING
NORMALIZING
DRAWING

GENERAL ELECTRIC

675-176B

You can get a HYDRO-BLAST

FOR CORE REMOVAL AND CASTINGS CLEANING

DESIGNED TO FIT YOUR INDIVIDUAL FOUNDRY PROBLEMS

★ ***REGARDLESS OF SIZE OR WEIGHT OF CASTINGS OR OF THE TONNAGE TO BE CLEANED PER DAY***

You'll find Hydro-Blast engineers good men to consult on modern cleaning methods—men whose long and intimate experience includes analyzing and solving cleaning problems in foundries of every type and size. That experience is yours to command—and with no obligation. Write us.

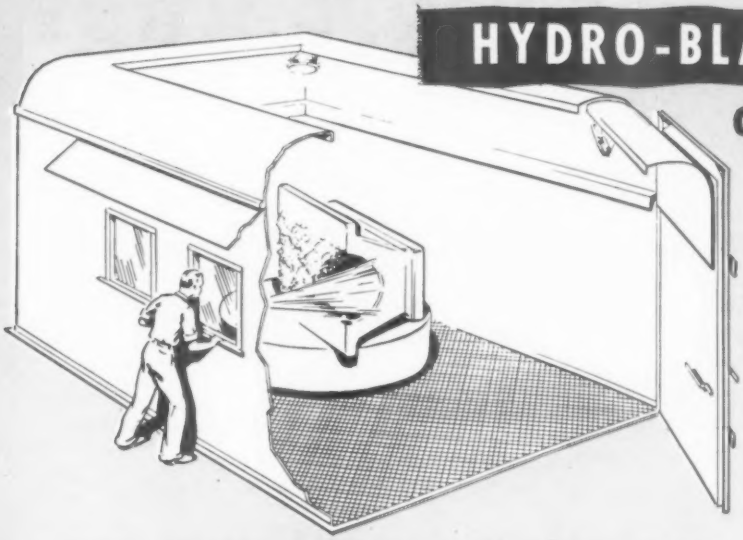
At the Foundry Show Visit
Hydro-Blast Booths 421-423
CONVENTION HALL

NO MATTER WHAT YOUR OWN CLEANING PROBLEM MAY BE, THERE'S AN EFFICIENT, ECONOMICAL HYDRO-BLAST APPLICATION TO ANSWER IT.

HYDRO-

2550 NORTH WESTERN AVE.

HYDRO-BLAST ROOM—
operator outside

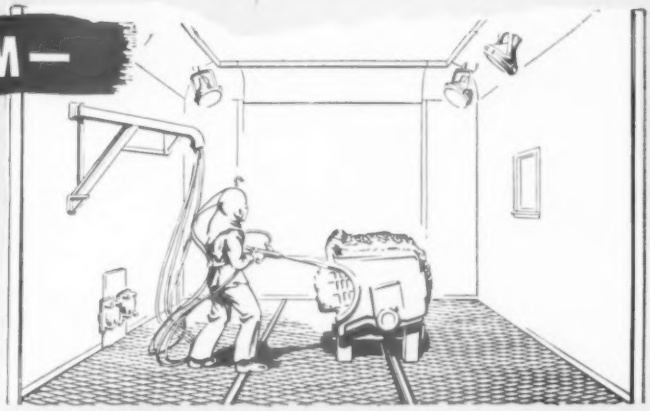


In many instances heavy, deeply cored castings can be economically Hydro-Blasted by means of large, mechanically mounted blast equipment controlled by an operator standing *outside the inclosure*. As a rule the castings are mounted on a turntable.

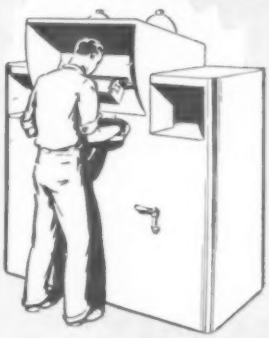
For cleaning castings too large for a turntable, the blasting equipment and operator can be mounted for moving mechanically back and forth across the face of the work.

HYDRO-BLAST ROOM—
operator inside

In foundries producing deeply cored castings, including many custom shops, cleaning can usually be most efficiently and economically done in a splash inclosure by Hydro-Blast operated manually. In many instances, it has been found convenient to handle castings on a turntable.

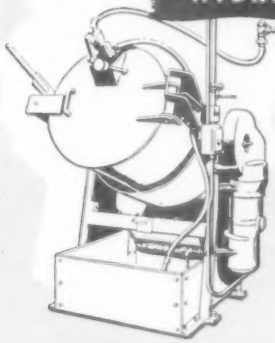


HYDRO-BLAST CABINET—
for cleaning smaller castings



Small castings requiring special individual attention, because of intricate cores or particular finish, can be efficiently and economically cleaned in a Hydro-Blast cabinet: handled by hand, as a rule, in small production; or, where volume production warrants, on a turntable or by conveyor equipped with special jigs, to convey castings through the cabinet.

HYDRO-BLAST BARREL—
for small castings



Small castings suitable for tumbling can be effectively, economically cleaned and finished in the Whiting Hydro-Blast Wet Barrel.

-BLAST CORPORATION

CHICAGO 47, ILLINOIS

FOREIGN REPRESENTATIVES

England—Pneulec Limited, Licensee, Smethwick (near Birmingham)

France and Switzerland—R. Dureuil, 4 Square Du Graisivaudan, Paris 17, France

Finland—Industria Osakeyhtio, Sodra Esplanadgatan 14, Helsingfors, Finland

Belgium—Charles Monseur, 195 Rue Saint Leonard, Liege, Belgium

Norway, Sweden, Denmark—Kollbye and Danielsen, Fridtjof Nansens Plass 6, Oslo, Norway

To Most of You in this Area
we render
OVERNIGHT SERVICE

And by "area" we mean that part of our country bounded by Canada on the North, Georgia on the South, Ohio and Kentucky to the West. Thanks to the superb rail, water and truck facilities of Philadelphia, foundry needs leaving here at nightfall are either with customers the next day . . . or just up the road a bit.

Shipping Everything for THE FOUNDRY
and we do mean "Everything"

"Everything" is quite an embracing word we know, but with our records reminding that we filled 99.60% of our orders last year (and 1947 was notorious for some real shortages) we feel that we have a mortgage on the word and will continue to use it challengingly.

The Heart of The Foundry Industry of "The East"

CHAPLETS

BINDERS

SUPPLIES

FACINGS

EQUIPMENT

●

PENNSYLVANIA FOUNDRY SUPPLY & SAND CO.
ASHLAND & EAST LEWIS STREETS
PHILADELPHIA 24 Telephone JE 5-1012

HERE'S HOW...

LINDBERG-Fisher 2-CHAMBER INDUCTION MELTING FURNACE DOUBLES ALUMINUM DIE CASTING PRODUCTION

Floyd J. Kamin, President, Kamin Die Casting & Manufacturing Co., says: "On this job our new Lindberg-Fisher Induction Melting Furnace turns out twice as much work as a conventional gas furnace with the same melting capacity, and rejects have decreased 65%—We operate continuously, and we find that melting cost is actually less than with a gas furnace of the same melting capacity."

Edmond L. Kornayzer, Plant Supt., says: "The furnace operates much cooler and operator fatigue is practically eliminated."

. . . Reduces Rejects 65% . . . Improves Working Conditions

Kamin Die Casting & Manufacturing Co., well known Chicago manufacturers of aluminum die cast products recently installed a 2-chamber Lindberg-Fisher Induction Melting Furnace. Here's a typical Kamin job —aluminum wheels used on Pincor lawnmowers. Check this "Before and After" story of increased production and reduction of rejects.

	BEFORE —*with conventional melting equipment*	AFTER —*with Lindberg-Fisher Melting Furnace*
Production Per Hour	25-30 Wheels	50-60 Wheels
Rejects Per 100	10-15 Wheels	3-5 Wheels

A few reasons why Kamin is well satisfied with this new Furnace

- Refractory lining holds molten metal, eliminates down-time to replace broken iron crucibles or pots.
- No contamination from iron pot or thermocouple.
- Continuous operation—when cold metal is added to charging chamber there is no temperature drop in ladling chamber.
- Operator does not have to push oxide coating to one side when ladling, as impurities remain in charging chamber.
- Super-sensitive thermocouple assures extremely accurate temperature control.
- Continuous electro-magnetic fluxing assures clean metal—prevents any possible segregation of alloys.
- Absolutely no worries about freeze-up because Lindberg-Fisher Furnaces can easily be started up after power failure.

See 2-Chamber Lindberg-Fisher Induction Melting Furnace in operation at the Foundry Show in Philadelphia (May 3-7)

Fisher Furnaces

A DIVISION OF LINDBERG ENGINEERING CO.

2453 West Hubbard Street, Chicago 12, Illinois

PATTERN JOBBERS AND FOUNDRYMEN

Rent Pressure Casting Equipment

ON LOW MONTHLY RENTAL RATES. WE CAN FURNISH FOR INSTALLATION IN YOUR PLANT, A COMPLETE UNIT OF PRESSURE CASTING EQUIPMENT. THIS EQUIPMENT IS DESIGNED FOR CONCRETE OR UPPER WOOD FLOOR INSTALLATIONS, REQUIRING LESS THAN 18 x 20 FEET OF FLOOR SPACE.

MAKE YOUR OWN PRESSURE CAST ALUMINUM MATCHPLATES, COPE & DRAG PLATES, CORE BOXES, LOOSE PATTERNS, FLAT PLATES, DRIER PATTERNS and other precision and experimental PRESSURE CASTINGS IN PLASTER MOLDS.

SAVE THE TWO-WAY WASTE IN TRANSPORTATION TIME, TO AND FROM MATCHPLATE VENDORS, AND GIVE YOUR CUSTOMERS FAST, EFFICIENT TWO DAYS TO ONE WEEK SERVICE, THAT HE WANTS.

CAPACITY OF OUR RENTAL UNIT IS (50) MATCHPLATES PER MONTH, OR, THE EQUIVALENT IN CORE BOXES OR OTHER PRESSURE CASTINGS, UP TO 18″ x 24″ FLASK SIZE.

LOW COST OF RENTAL WILL MAKE THE UNIT PROFITABLE TO YOU, IF YOU MAKE OR USE AS FEW AS (6) MATCHPLATES OR THE EQUIVALENT IN CORE BOXES OR OTHER TYPES OF ALUMINUM PATTERN EQUIPMENT PER MONTH.

PRESSURE CASTING TECHNIQUE WILL BE FURNISHED COMPLETE TO ALL OUR LESSEES OF RENTAL UNITS, INCLUDING PERSONAL INSTRUCTIONS IF DESIRED. APPRENTICES OR SAND MOLDERS CAN PRODUCE PRESSURE CASTINGS QUICKLY WITH OUR ASSISTANCE.

PROSPECTIVE LESSEES ARE INVITED TO VISIT OUR DETROIT PLANT TO SEE ONE OF OUR RENTAL UNITS SET UP.

ALL MATERIAL SOURCES WILL BE SUPPLIED BY US WITHOUT OBLIGATION.

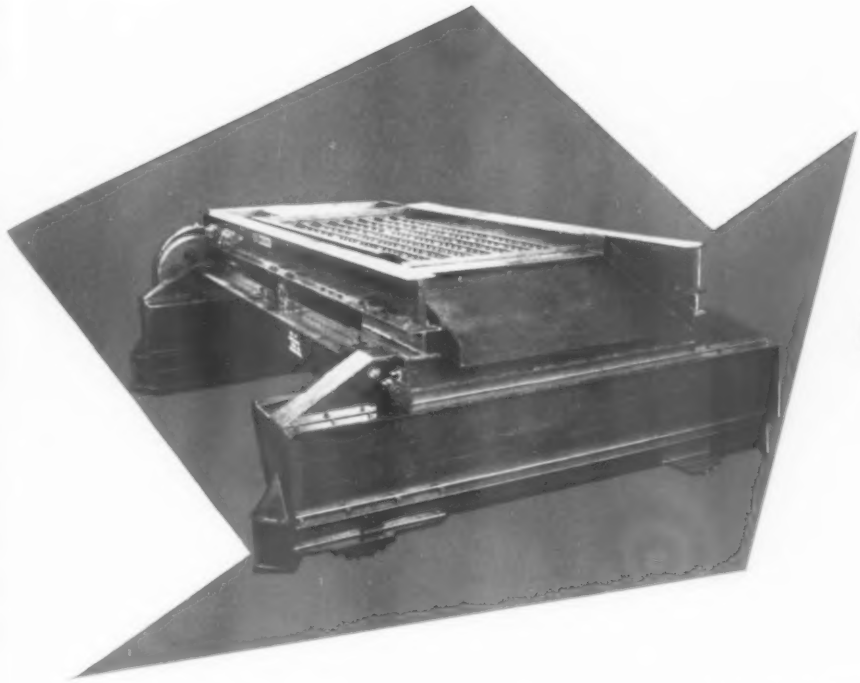
WE GUARANTEE SATISFACTORY PERFORMANCE OF OUR RENTAL EQUIPMENT, OUR TRAINING SERVICE, COOPERATION, AND, A COMPLETE, PRACTICAL SET UP.

●

PRESSURE CAST PRODUCTS CORPORATION

1030 VERMONT AVENUE **DETROIT 16, MICHIGAN**

See our other advertisement, Page 63



SIMPLICITY portable shakeouts handle loads from 500 to 100,000 lbs.

For plants where there are no facilities to take work to the shakeouts, Simplicity builds shakeouts that can be taken to the work. For example, the self-propelled 4′ x 8′ Simplicity Shakeout illustrated travels on a sandslinger track in a Chicago foundry, hoisting flasks to the vibrating deck and quickly shaking the castings free while ejecting the sand in windrows between the tracks. This unit has a safe load capacity of 5,000 lbs. and can be built in capacities up to 16,000 lbs.

Any standard size Simplicity Shakeout may be made portable by mounting on a cast or I-beam frame, and it will operate as efficiently as in a permanent installation. Let us review your shakeout requirements. If portability is required, we'll show you how portable Simplicity Screens—from 2′ x 3′ units of 500 lb. capacity to 15′ x 25′ models of 100,000 lb. capacity—will do more shakeout work for you in less time and for less money. Write for complete particulars.

LET'S MAKE A DATE!

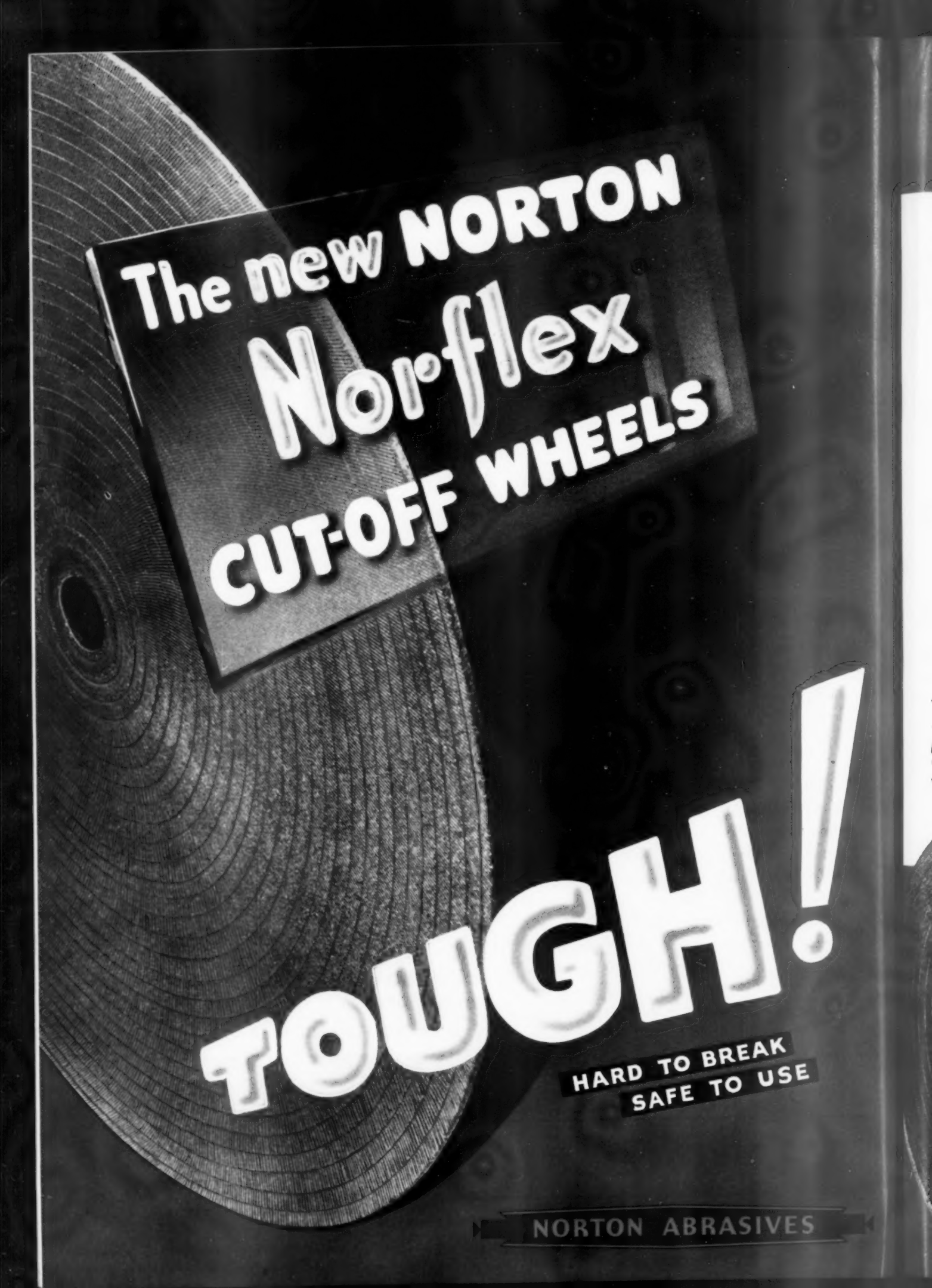
WE'RE LOOKING FORWARD TO SEEING YOU AT THE 1948
FOUNDRY CONGRESS AND SHOW
at

- **THE PHILADELPHIA MUNICIPAL AUDITORIUM**
- **MAY 3-7**

OUR BOOTH NUMBER IS 1214

Simplicity
TRADE MARK REGISTERED
ENGINEERING COMPANY, DURAND, MICHIGAN

- SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A. o FOR CANADA:
- CANADIAN BRIDGE ENGINEERING CO., LTD., WALKERVILLE, ONTARIO.
- FOR EXPORT: BROWN & SITES, 50 CHURCH ST., NEW YORK 7


The new NORTON
Norflex
CUT-OFF WHEELS
TOUGH!
HARD TO BREAK
SAFE TO USE
NORTON ABRASIVES

Increase Your Production—
Reduce Your Cutting Costs!

HERE'S the latest Norton development—the new reinforced NORFLEX Cut-off Wheels—wheels especially designed for cutting gates and risers from non-ferrous castings.

They're Strong and Safe

Operators don't have to "baby" these wheels—in fact they can even twist and bend them. See how the wheel illustrated at the right takes 170 pounds dead weight without damage.

They Cut Fast

Operators find that these new, safe wheels cut every bit as fast as the rubber bonded wheels they've been using.

They Have Long Life

Not only do the new reinforced NORFLEX Cut-off Wheels wear away more slowly than rubber wheels but you get the full life of each wheel. It's not shortened by breakage.

They Are Versatile

There's less time wasted changing wheels for this new NORFLEX product cuts all non-ferrous metals and steel with almost equal ease.

The new reinforced NORFLEX Cut-off Wheels will definitely reduce cut-off costs. It's already been proved in many foundries. Prove it in your own. Get in touch with your Norton abrasive engineer or your Norton distributor.

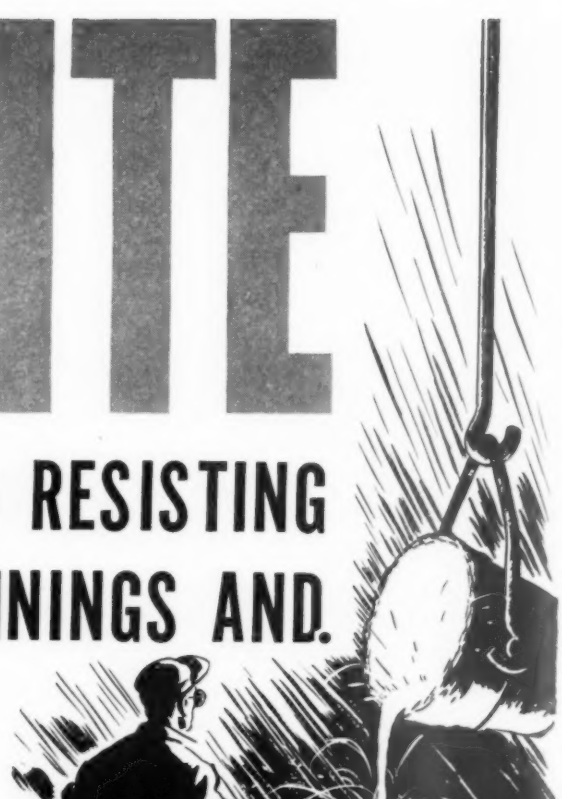
NORTON COMPANY
Worcester 6, Mass.
Distributors in All Principal Cities

A Cordial Invitation
to YOU
to visit the
DELTA OIL PRODUCTS CO.
EXHIBIT
of
Scientifically Developed
Foundry Products

. . . BOOTHS 307 & 309
AT THE
A.F.A. 1948 FOUNDRY CONGRESS AND SHOW
IN PHILADELPHIA
MAY 3rd to 7th
. . . DELTA FOUNDRY PRODUCTS SPEED PRODUCTION OF FINER-FINISH CASTINGS AND CUT PRODUCTION COSTS
PLASTIC-TYPE Core and Mold Washes for steel, malleable, grey iron and non-ferrous metals. NO-VEIN Compound. CHILL-KOAT. SPRAY BINDERS. PERMI-BOND (seacoal replacement). BONDITE. PARTEX (nut shell parting). MUDDING COMPOUND. SAND CONDITIONING OILS. PYRO-KOAT. LIQUID PARTING. CORE OILS and BINDERS.
DELTA OIL PRODUCTS CO.
MILWAUKEE 9, WISCONSIN

SLAGTITE

THE NEW IRON AND SLAG RESISTING REFRACTORY FOR LADLE LININGS AND CUPOLA MAINTENANCE



MR. FOUNDRYMAN . . . SLAGTITE

is *Your Material* — your help, suggestions and information passed on to our Research Department. This valuable information, plus the refractory material we are able to process, has resulted in SLAGTITE.

SLAGTITE comes in 3 forms:

The refractory materials used in SLAGTITE were selected to retard slag penetration, withstand high temperatures, good working qualities, with graphite added.

What will SLAGTITE do for the "Iron Industry?" Reduce ladle maintenance, clean ladles, clean iron, less inclusion in the iron, less scrap castings.

SLAGTITE (PLASTIC)
Mixed at the plant, ready for ramming, sliced and packed in 100 lb. cartons.

SLAGTITE (DRY)
To be mixed on the job — for ramming with air hammer or mallet — add 6% to 8" water. For hand packing or tamping, add up to 12% water. Packed in 100 lb. bags.

SLAGTITE (MORTAR & COATING)
A finely ground, dry material to be mixed with water to obtain a desired mortar consistency, to be used as a bricklaying mortar, coating or wash. Shipped in 100 lb. bags.

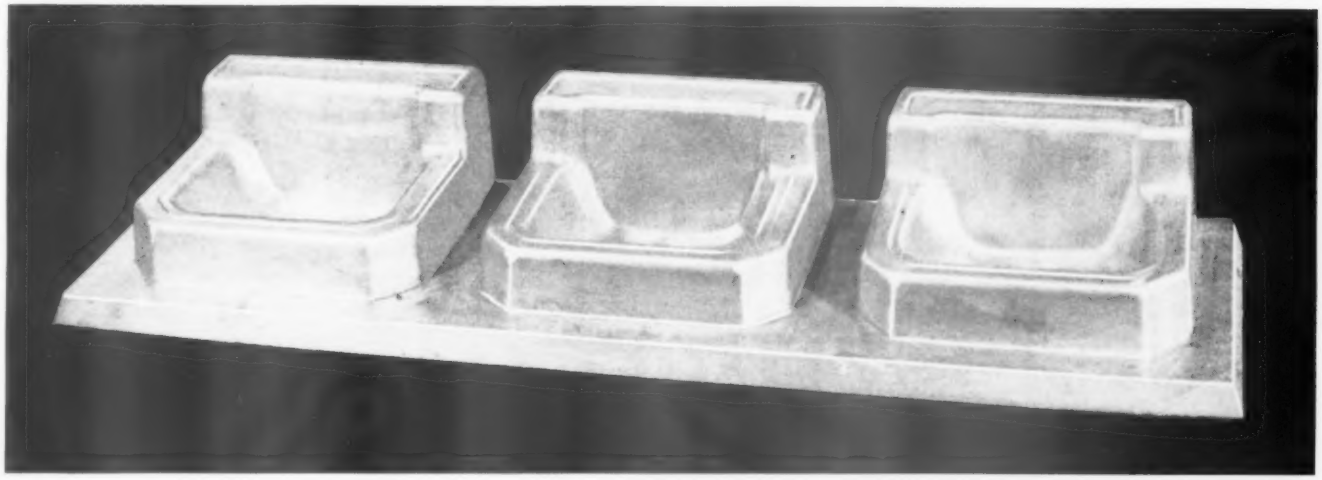
We will exhibit SLAGTITE and other Laclede Refractories during the American Foundrymen's Association Convention in Philadelphia.

LACLEDE-CHRISTY COMPANY

1711 AMBASSADOR BLDG. ST. LOUIS 1, MISSOURI

Quality First

BRANCH OFFICES: Chicago • New York • Pittsburgh • Cleveland • Houston • Detroit • Indianapolis • Milwaukee • San Francisco



For the smoothest, fastest and most accurate aluminum pattern equipment

PRECISION PATTERNS

WITHOUT SIZE LIMITATIONS

Increased profitable production at lower cost with less scrap is a positive and direct result obtained by using our pressure cast aluminum pattern equipment.

We shall be pleased to receive your request for quotations, delivery dates and layout forms.

See our other ad. on Page 56.

MATCH PLATES
MULTIPLE COREBOXES
COPE & DRAG-PLATES
LOWEST CLEANUP COST
PROMPT DELIVERY

Only one master pattern required. Allow 1/8" per ft. for our shrinkage

PRESSURE CAST PRODUCTS CORPORATION
1030 VERMONT AVENUE DETROIT 16, MICH. Tel. TAshmoo 5-8188

AFFILIATED PLANT LOCATIONS:

Birmingham, Ala.	Coffeyville, Kan.	Menasha, Wis.	Ottumwa, Iowa
821 N. 21st St.	1502 W. 8th St.	220 Washington St.	207 S. Sheridan

COLEMAN CORE AND MOLD OVENS

"EFFICIENT BEYOND EXPECTATIONS"

reports S. V. WOOD, Pres., Minneapolis Electric Steel Castings Co., Minneapolis, Minnesota

"We are enthusiastically complimenting you on the quality of our Coleman Oven installation and its operation...The ovens have been entirely satisfactory and the efficiency which they have attained has been beyond our expectations...

"We should like to express to you our very great satisfaction with the promptness and exactitude with which you filled our order and completed the installation..."

Thousands of other foundries have also found "efficiency beyond expectations" with their Coleman Ovens. These are a few of the reasons why:

DEPENDABLE BAKING AND DRYING. Coleman Ovens eliminate all uncertainties in core baking and mold drying. Rejects and make-overs are eliminated.

INCREASED LABOR SAVING. Efficient and modern mechanical design reduces handling and other indirect labor to a minimum.

HEAVY DUTY CONSTRUCTION. Responsible for dependable performance, economical operation and low maintenance cost under rugged service requirements.

MAXIMUM FUEL ECONOMY. Coleman heating systems use the most economical fuel available to you—gas, oil, stoker-coal, electricity, etc.

BETTER WORK CONDITIONS. Positive ventilation built into Coleman Ovens prevents leakage of fumes and gases and helps to make the core department a good place to work.

ADVANCED OVEN KNOW-HOW. This has been gained through specialization in the field of foundry ovens. Coleman Oven Engineers have been designing and building foundry ovens for over 40 years.

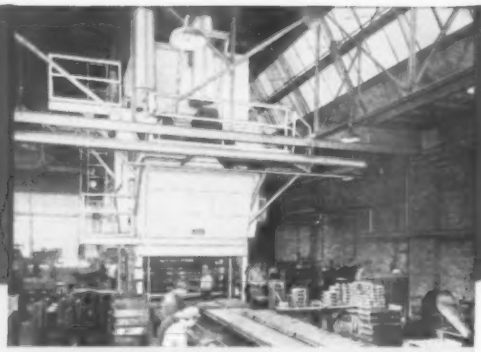
WRITE TODAY FOR FOLIO OF BULLETINS

COLEMAN CAR-TYPE OVENS ARE AVAILABLE IN A WIDE RANGE OF SIZES AND CAPACITIES FOR VARIOUS PRODUCTION NEEDS, ASSURING DEPENDABLE PERFORMANCE AT LOWEST POSSIBLE COST

The FOUNDRY EQUIPMENT C

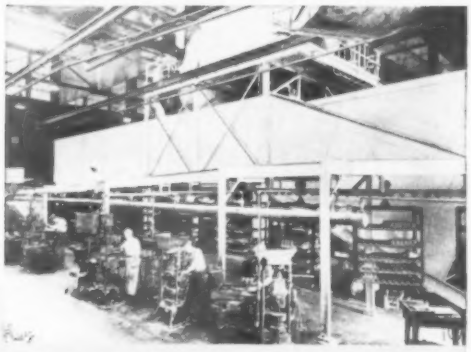
CLEVELAND 13, OHIO, U. S. A

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

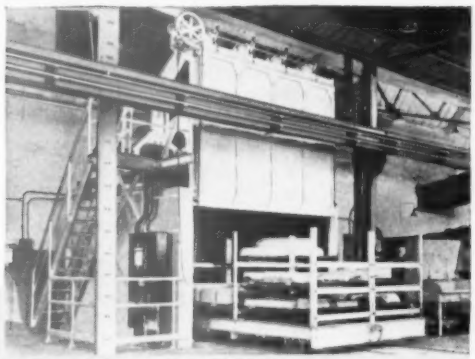


COLEMAN TOWER OVENS
For high speed production at lowest cost. Patented Open Center permits loading from inside and out, providing maximum labor saving.

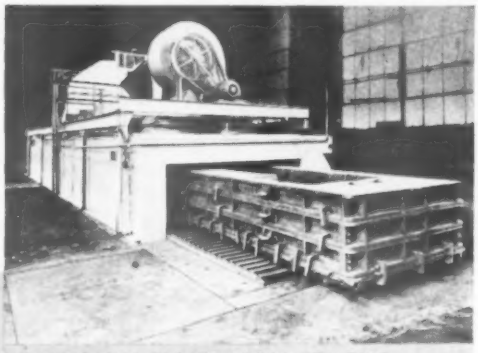
COLEMAN TRANSRACK OVENS
For use with portable racks to reduce handling labor. Very efficient where ample floor space is available.



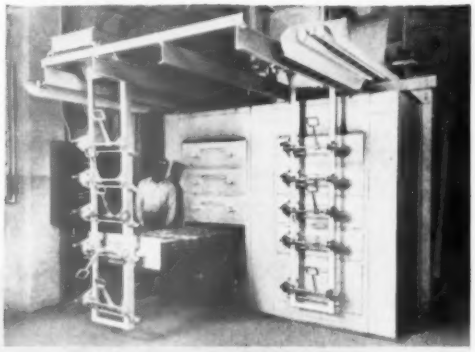
COLEMAN HORIZONTAL CORE OVENS
Overhead conveyor ovens specially designed for large scale production foundries in such fields as agricultural, automotive, etc.



COLEMAN CAR-TYPE OVENS
For baking large cores or drying molds. Coleman Car-Type Ovens are used by most of the leading producers of heavy castings.



COLEMAN CONTINUOUS MOLD OVENS
For high speed continuous drying of molds. These ovens provide amazing drying speed at a fraction of the cost of former methods.



COLEMAN ROLLING DRAWER OVENS
For small and medium cores. High-speed production with limited floor space.

COLEMAN PORTABLE CORE OVENS AND COLEMAN PORTABLE MOLD DRYERS ARE OTHER MEMBERS OF THE COLEMAN FAMILY OF COMPLETE CORE BAKING AND MOLD DRYING EQUIPMENT

COMPANY
BUILDERS OF COLEMAN AND SWARTWOUT OVENS

MEMBER
MANUFACTURERS ASSOCIATION, INC. FOUNDRY EQUIPMENT

COLEMAN
CORE AND MOLD OVENS

OVER 9000 SUCCESSFUL INSTALLATIONS

IRONTON BERLITE

Photo Courtesy—Chicago Pneumatic Tool Co.

Ask us for Service Data on "Ironton Berlite"

Do you use brick lined ladles? "Ironton Berlite" used as a mortar and wash coat increases the life of the brick lining at least 400 per cent, in ladles from 1 to 10 tons capacity. There is no failure at the brick joints, and no slagging in the ladles. For cleaner castings and less ladle repair work, use "Ironton Berlite".

"Ironton Berlite" also gives excellent service in hand shank ladles, cupola troughs, teapot spouts, rammed tap holes, and for laying up cupola blocks in the well and melting zone.

THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO

Electro SERVES THE METAL INDUSTRIES WITH ENGINEERED SPECIALTIES AND BACKS ITS PRODUCTS WITH JOB-SIDE ENGINEERING COOPERATION

Patent Applied for

FROM faster melting, and safer, faster handling TERCOD CRUCIBLES, right through to the famous "Electro" High Speed, Cut-off, Snagging and Finishing Wheels, "Electro" Specialties help to improve quality, increase production, reduce costs and raise safety factors to new highs. Send for informative literature on the items which interest you or, better still, let us send, without obligation a Qualified Field Engineer to cooperate with you at job-side. Here are some of our products:

GENERAL PRODUCTS
Resin-Bonded, High-Speed Abrasive Wheels—Refractories—Crucibles—High Temperature CEMENTS—Alloys—Stopper Heads—Furnace Covers and Linings.

BRASS ROLLING MILLS
Door Assemblies—Furnace Covers and Linings—CEMENTS—High-Speed Grinding Wheels—Crucibles and Pedestal Blocks.

NON-FERROUS FOUNDRIES
Additive Alloys—CEMENTS—Grinding Wheels—Furnace Covers and Linings—Crucibles and Pedestal Blocks.

HEAT TREATING AND ANNEALING
Box Type Muffles—CEMENTS—Hearth Tile—Muffle Tile.

FERROUS FOUNDRIES
(Steel, Malleable, Cast-Iron)
Stopper Heads—High Speed Grinding Wheels—CEMENTS

FOR STEEL MILLS AND SMELTERS
High-Speed Grinding Wheels—Stopper Heads—Brick—CEMENTS—Furnace Covers and Linings—Crucibles and Pedestal Blocks.

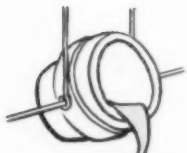
Send for information on the items that interest you.

AT BOOTH 1112
A. F. A. FOUNDRY
Congress and Show
Philadelphia, May 3-7

Electro
SINCE 1919

Electro Refractories & Alloys Corporation

344 DELAWARE AVE. *(West Coast Warehouse, Los Angeles)* BUFFALO 2, N. Y.



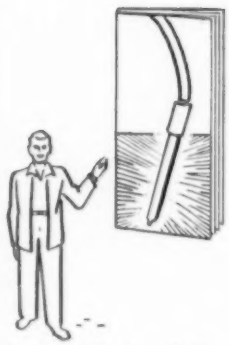
"...it gives us control of our pouring temperatures..."

Right now, in these days of high production costs in the foundry, is when close control of molten metal temperatures is specially needed. Good castings are more costly now, but so are the faulty castings that must go to the scrap bin!

Nonferrous foundries everywhere use Marshall Enclosed-Tip Thermocouples to assure good, sound metal castings, and to prevent loss due to shrinkage and misruns. With Marshall Thermocouples, temperature of the melt can be determined quickly, and without fuss or trouble. They report the temperature accurately assuring a correct reading within a few seconds after being immersed.

"We appreciate the way Marshall Thermocouples give us control of our pouring temperatures," writes an Ohio foundry. "This close check has reduced our losses to almost nil on both aluminum and silicon bronze jobs. We particularly like the way they enable us to get the same temperature repeatedly.

Write for the free descriptive literature to L. H. Marshall Co., 270 W. Lane Ave., Columbus 2, Ohio. This data will aid you in making still better castings.



Send for this free Folder which describes and illustrates Marshall Enclosed-Tip Thermocouples.

MARSHALL

THERMOCOUPLES

Carbon CONTRO

WITH GREATER PRECISION AND SPEED

The improved Dietert-Detroit Carbon Determinator provides a easy method for making either preliminary or final carbo tests on all metals, organic or inorganic materials.

Principal Advantages:

RELIABLE: Results reproduced consistently minimum chance for human error.

FAST: Results available within 2 minutes aft sample is weighed.

ECONOMICAL: Low first cost and low ope ating costs.

WIDE RANGE: Burettes available f low carbon materials, steels, irons an organic substances.

Construction and Operation

1. Mechanically operate leveling bottle.
2. Includes combustion g cooler.
3. Atmospheric pressu applied automatically.
4. Gas burette cooled by a sorption liquid.
5. Absorption vessel and g burette integral and rema at same temperature.
6. Easy precision leveling meniscus line.
7. Automatic pressure equa izer.
8. Compact assembly requir minimum space.
9. Single, large, durable g valve controls entire oper tion.

The Dietert-Detroit Carbon D terminator is installed either in t laboratory or in the plant f profitable carbon control and i proved product quality.

Price $219.0 f.o. DETRO

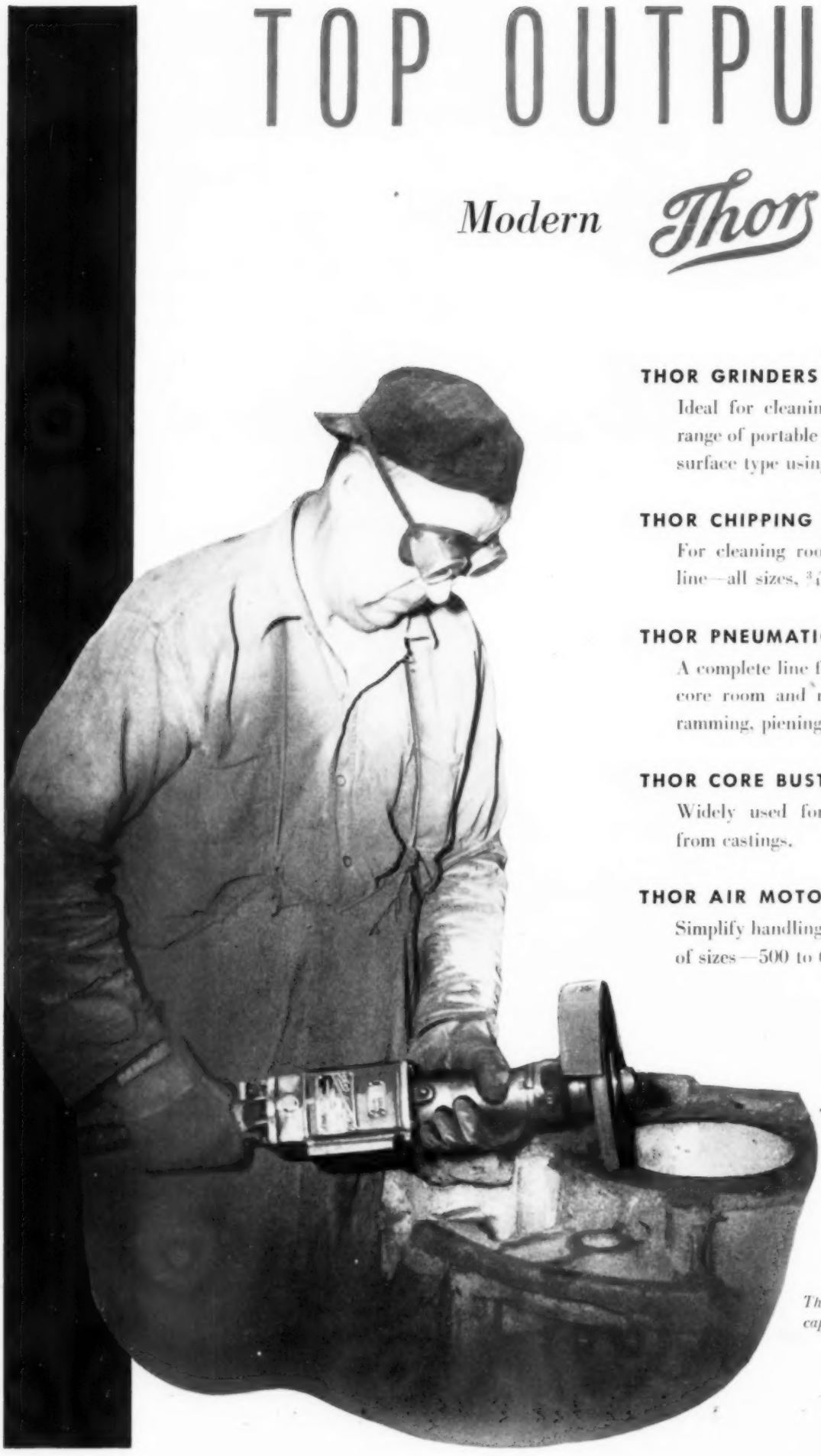
HARRY W. DIETERT CO.

9330 ROSELAWN AVE., DETROIT 4, MICHIGAN

SAND • MOLD • MOISTURE • SULFUR • CARBON

TOP OUTPUT.....

Modern Thor *Tools* . . . .



THOR GRINDERS

Ideal for cleaning room use. Complete range of portable grinders, radial type or surface type using cup grinding wheels.

THOR CHIPPING HAMMERS

For cleaning room chipping. Complete line—all sizes, ¾" to 4" stroke.

THOR PNEUMATIC RAMMERS

A complete line for floor or bench work; core room and molding machine sand ramming, piening and butting off.

THOR CORE BUSTERS

Widely used for knocking out cores from castings.

THOR AIR MOTOR HOISTS

Simplify handling flasks. Complete range of sizes—500 to 6,000 pounds capacity.

Thor 360 Grinder in wheel capacities from 4" to 8".

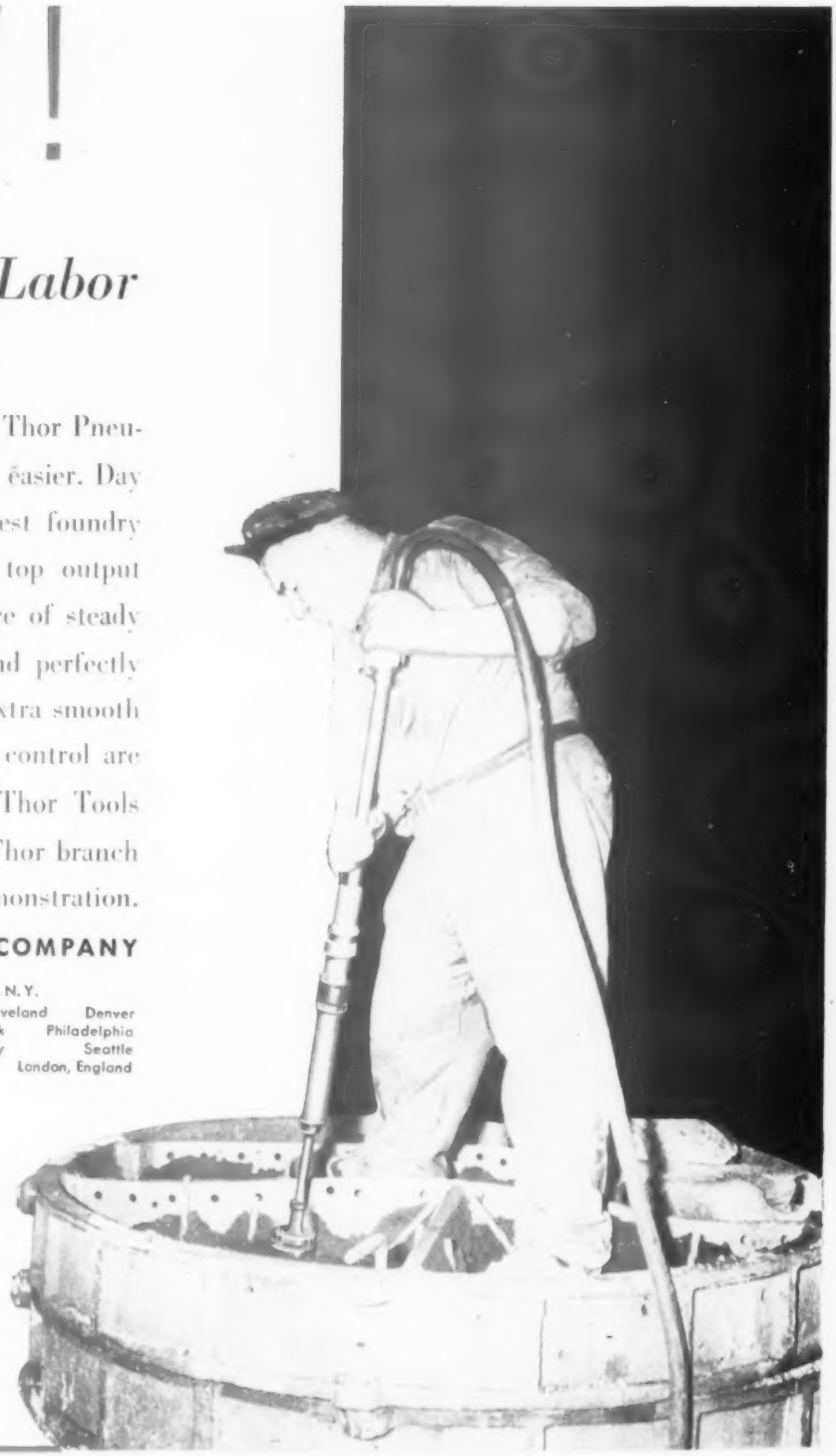
....DAILY!

... *Save Time and Labor*

When jobs are toughest, powerful Thor Pneumatic Tools get work done faster and easier. Day after day, they stand the gaff of hardest foundry usage—with tremendous capacity for top output at minimum labor cost. With abundance of steady power, Thor Tools are light weight and perfectly balanced for easier handling . . . and extra smooth operation. Instant starting and positive control are plus features. Prove to yourself why Thor Tools are favored by foundries. Your nearby Thor branch will arrange a practical on-the-job demonstration.

INDEPENDENT PNEUMATIC TOOL COMPANY
AURORA, ILLINOIS
Export Division: 330 West 42nd Street, New York 18, N.Y.

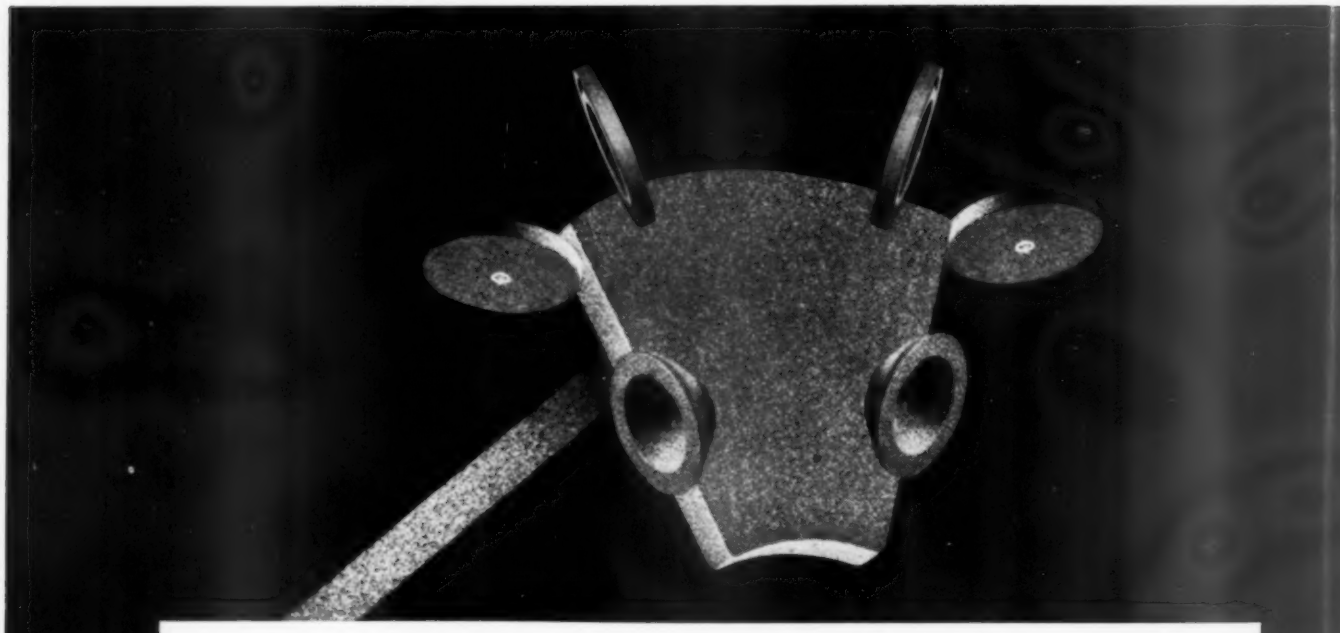
Birmingham Boston Buffalo Chicago Cincinnati Cleveland Denver
Detroit Houston Los Angeles Milwaukee New York Philadelphia
Pittsburgh St. Louis St. Paul Salt Lake City Seattle
San Francisco Toronto, Canada Sao Paulo, Brazil London, England



Thor Floor Rammer in Action.

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS



Got your neck stuck out on grinding costs?

Are you reaching for longer wheel life—but really cutting down stock removal, instead?

Or are you trying to avoid wheel loading—while actually boosting dressing costs and wheel wear? Too often you can unwittingly stick your neck out when reaching for lower grinding costs.

Make sure that your grinding isn't costing you more than it should. Let Peninsular engineers make a complete check-up. They'll examine your machinery, your methods, the materials you grind. They'll analyze their findings carefully, and give you suggestions based on a thorough knowledge of your grinding problems.

The wheel formulas they recommend will be individually engineered to your grinding jobs.

Such custom-tailored Peninsular grinding wheels have been cutting costs in almost every industry for nearly sixty years.

When may we call on *you?*

The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Buffalo, Cleveland, Pittsburgh, Houston, St. Louis, Cincinnati.

PENINSULAR

INDIVIDUALLY PENINSULAR *ENGINEERED*

GRINDING WHEELS

SINCE 1889

SPECIALISTS IN RESINOID BONDED WHEELS

The component parts of the two illustrations on these pages consist of photographs of various standard types and sizes of grinding wheels manufactured by Peninsular.

Left: Heat Treat Oven for non-ferrous metals showing castings supported on door shelves.

Right: Battery of Core Ovens showing apparatus for individual heating and temperature control.

CONVENTION AND EXHIBITS SCHEDULE
(Tentative)

Monday, May 3

8:30 a.m.—Registration begins. Exhibits open.
12 noon—Tech... Educational;
Aluminum and Magnesium ... round-table
luncheon; Malleable ... Aluminum and
6:30 p.m. — Registration closes. Exhibits close.
6:30 p.m.—Educational Division dinner.
8-10 p.m. — Technical sessions — Gray Iron Shop Course; Sand Shop Course.

Tuesday, May ...
... open.
... Aluminum
... and Magnesium round-
... luncheon; Malleable round-table luncheon.
2 p.m.—*Philadelphia Day* opens.
2-4 p.m. — Technical sessions — Brass and Bronze; Pattern ... Heat Transfer.
5:30 p.m. — ... Directors' dinner.
7 p.m.—Ch...
8-10 p.m. ... sessions — Plant and Plant Equi... Gray Iron Shop Course; Sand Shop Course.
9 p.m.—Exhibits close.

Wednesday, May 5

a.m.—Registr... open.
9:30-10:15 a.m. ...
12 ... round-table luncheon. Engineering Graduates luncheon.
2-4 p.m.—Technical session—Refractories.
4-6 p.m.—Technical session—Sand.
5:30 p.m. — Registration closes. Exhibits close.
7 p.m.—Canadian dinner.
8-10 p.m. — Technical sessions — Gray Iron Shop Course; Sand Shop Course; Refractories.

Thursday, May 6

9 a.m.—Registration opens. Exhibits open.
10-12 noon—Technical sessions—Job Evaluation and Time Study; Gray Iron; Steel.
12 noon—Steel round-table luncheon.
2-4 p.m. — Technical sessions — Cost; Gray Iron.
4-6 p.m.—Technical sessions—Job Evaluation and Time Study; Sand.
5:30 p.m. — Registration closes. Exhibits close.
7 p.m.—Alumni dinner.
8-10 p.m. — Technical sessions — Gray Iron Shop Course; Sand Shop Course.

Friday, May 7

9 a.m.—Registration opens; Exhibits open.
10-12 noon—Technical sessions—Gray Iron; Steel.
2-4 p.m. — Technical sessions — Gray Iron; Steel
4:30 p.m. — Registration closes. Exhibits

Keynote!
Modernize
your
Equipment

ROSS CORE and HEAT TREAT OVENS

STATIONARY · CONTINUOUS · CONVEYOR

In view of competitive standards and increasing costs for labor, material and fuel, the slow, wasteful operating methods are definitely out. Overbaked or underbaked cores and improperly heat treated castings and forgings are major causes of waste and inefficiency. ROSS Ovens, expertly designed to perfectly maintain uniform temperatures throughout all sections of the oven can effect savings sufficient to rapidly offset the cost of installation. Ask us to show you what can be done.

Older type ovens, if in good shape, can be modernized with properly designed ROSS Heating Systems. Consult us. You might be surprised at the possibilities uncovered by our engineers.

ROSS SYSTEMS

J. O. ROSS ENGINEERING CORPORATION

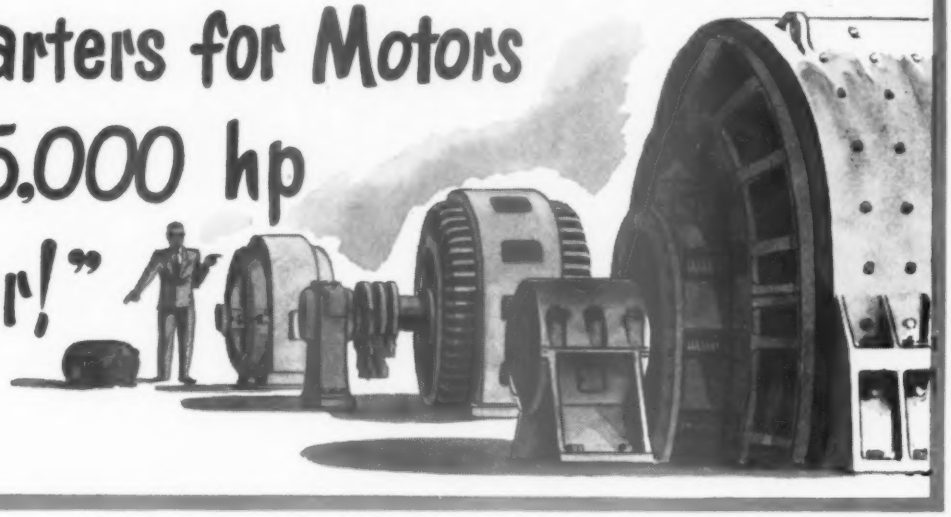
MANUFACTURERS OF AIR PROCESSING SYSTEMS

350 MADISON AVENUE NEW YORK 17, N. Y.

201 N. Wells Street, CHICAGO - 6 • 79 Milk Street, BOSTON - 9 • 9225 Grand River Avenue, DETROIT - 4 • 1231 E. Seventh Street, LOS ANGELES - 21

ROSS ENGINEERING OF CANADA, LIMITED, MONTREAL 19, CANADA • CARRIER-ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

"Headquarters for Motors ½ to 25,000 hp and Over!"



Do You Need General-Purpose, squirrel-cage motors from 1 to 200 hp? Call either your nearby Allis-Chalmers *Authorized Dealer* or District Office. They may be able to help you from stock right now!

But For Large Ratings—250 to 25,000 hp and over—your Allis-Chalmers *field engineer* is the man to call. He can give you *expert* motor advice; help you solve difficult drive problems involving large or small motors. And he'll save you time and money.

Allis-Chalmers Motor-Building capacity has been greatly increased. New methods, new equipment have been put to work to turn out *good* motors in greater numbers.

And Our Delivery Situation is improving! For *reliable* delivery information call any of over 60 District Offices or over 200 Allis-Chalmers Dealers. They have *up-to-the-minute* delivery information available to them!

Building Good Motors for Over 50 Years

THE *QUALITY* of Allis-Chalmers motors is best proven by their records of performance. Look back at your own experience, or ask your friends in industry who have "A-C" motors what they think of them. The answer is invariably the same . . . "They're *good* motors, liberally designed, easy to service, and run year-after-year with little attention."

Whether you're buying ½ hp motors to be designed into your product . . . or a 25,000 hp motor for a steel mill you can rely on the *good* quality of "A-C" motors! ALLIS-CHALMERS, MILWAUKEE.

A 2400

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

STANDARD HORSE NAIL CORPORATION

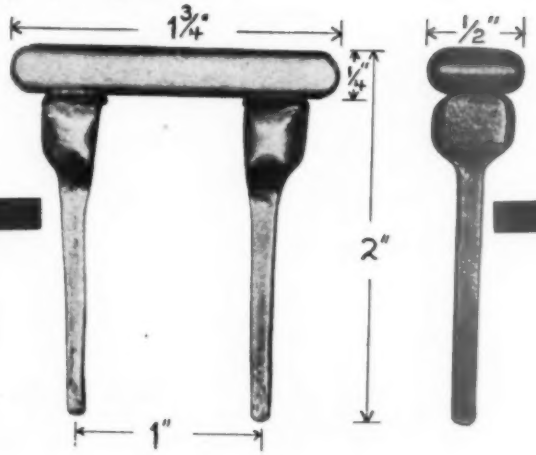
CHILL KOOLHEAD NAILS

COLD FINISHED HOT FORGED

Supplying chill nails to the foundry industry for 76 years! Thats a record for any organization . . . a record proving a good product.

Chill Nails for every purpose:

STEEL
BRASS
STAINLESS
ALUMINUM



"KOOLHEAD SPIDER CHILLS"
HORSE SHOE NAILS

VISIT
BOOTH 530
AFA
CONVENTION
AND EXHIBIT

Philadelphia, Pa.
MAY 3-7, 1948

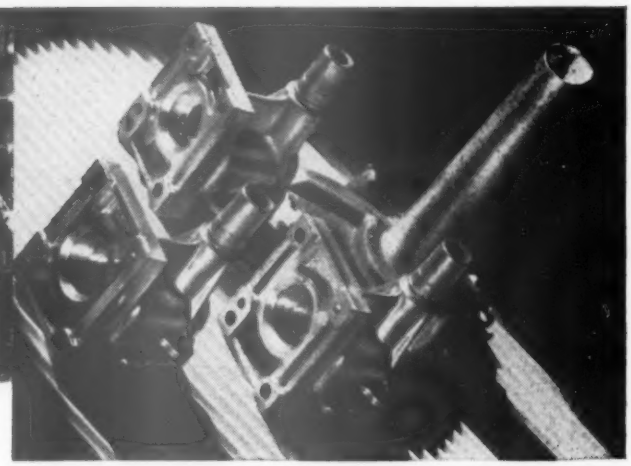
STANDARD HORSE NAIL CORP.

New Brighton, Pennsylvania

If you're considering new die casting machinery...

why not profit from the experience of others?

One of a battery of 5 Model 400 Clevelands in operation in the modern plant of the St. Louis Die Casting Corp., St. Louis, Mo. The operator is removing the casting shown at right.



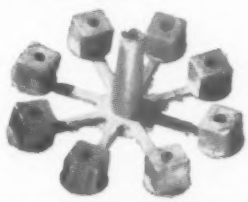
ST. LOUIS DIE CASTING CORP. *gets better castings, faster, at less cost* WITH CLEVELAND MODEL 400's

These three examples are typical of the production —*around the clock*—that experienced die casters are getting from Cleveland Die Casting Machines. You too can get better castings, faster, at less cost, with Clevelands.

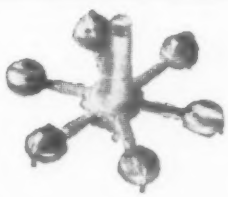
Let a Cleveland engineer show you *further proof* of the advantages these machines can bring to your die casting production. For complete information on machine specifications, write now for bulletins.

340 SHOTS PER HOUR!
Weight of metal per shot 14.35 oz. Weight per piece 4.6 oz.

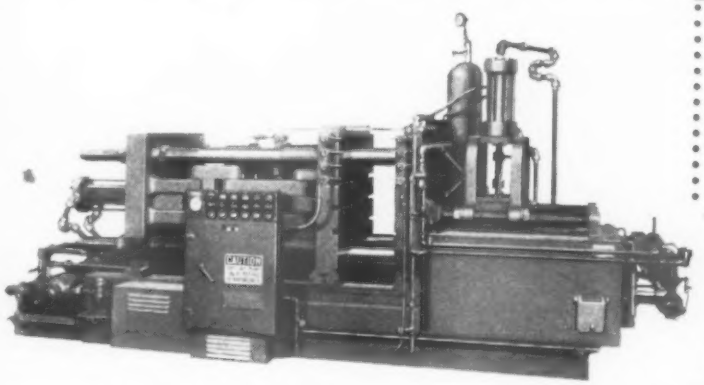
Zinc fan gear case casting from two-cavity die with movable cores. Most of the cored holes required no further finishing. Three critical dimensions are held to ± .001" tolerance. Each casting receives a careful spot check, and at time photo was taken, 170,000 castings had been produced without a single reject.



325 SHOTS PER HOUR!
Weight of metal per shot 3.3 lbs. Weight per piece 4.75 oz. Zinc nuts cast from 8-cavity die.



375 SHOTS PER HOUR!
Weight of metal per shot 1.15 lbs. Weight per piece 1.8 oz. Zinc nobs for electric control panel cast from 6-cavity die.

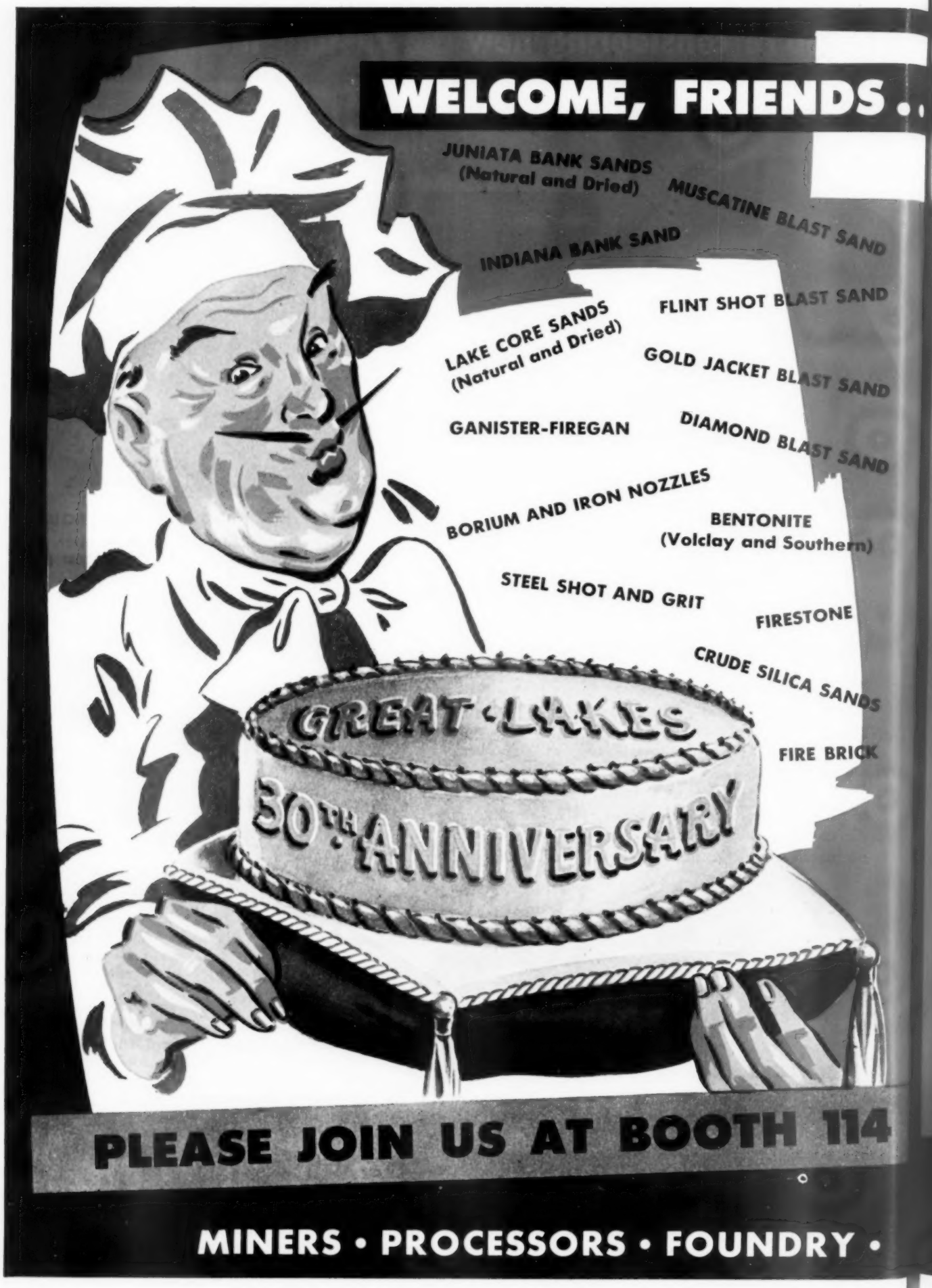


Cleveland Model 400 Universal High-Pressure Hydraulic Die Casting Machine for zinc, tin or lead. Hot metal end can be easily changed to convert to cold chamber machine. 36" x 38" die plates. Approx. 800,000 lbs. locking pressure.

THE CLEVELAND AUTOMATIC MACHINE COMPANY

4926 BEECH STREET • • CINCINNATI 12, OHIO

CHICAGO (6) 3710 Civic Opera Bldg. CLEVELAND (14) 1114 NBC Bldg. DETROIT (2) 540 New Center Bldg.
HARTFORD (1) 529 Capital National Bank Bldg. NEW YORK (6) 2402 Singer Bldg.


WELCOME, FRIENDS..
JUNIATA BANK SANDS
(Natural and Dried)
MUSCATINE BLAST SAND
INDIANA BANK SAND
FLINT SHOT BLAST SAND
LAKE CORE SANDS
(Natural and Dried)
GOLD JACKET BLAST SAND
GANISTER-FIREGAN
DIAMOND BLAST SAND
BORIUM AND IRON NOZZLES
BENTONITE
(Volclay and Southern)
STEEL SHOT AND GRIT
FIRESTONE
CRUDE SILICA SANDS
FIRE BRICK
GREAT LAKES
30TH ANNIVERSARY
PLEASE JOIN US AT BOOTH 114
MINERS • PROCESSORS • FOUNDRY •

It's our 30th Anniversary!

We've enjoyed serving you members of the foundry industry during these restless, momentous years since 1918.

You have made great progress in the art of casting metals during this period. We can only measure our own success in terms of your achievements.

To keep pace with you, we are constantly improving our facilities. Our properties are provided with the most efficient types of mining and processing equipment. At our Juniata sand deposits which extend over 2,000 acres, with many years visible supply, we have just completed a new, large, thoroughly modern drying plant.

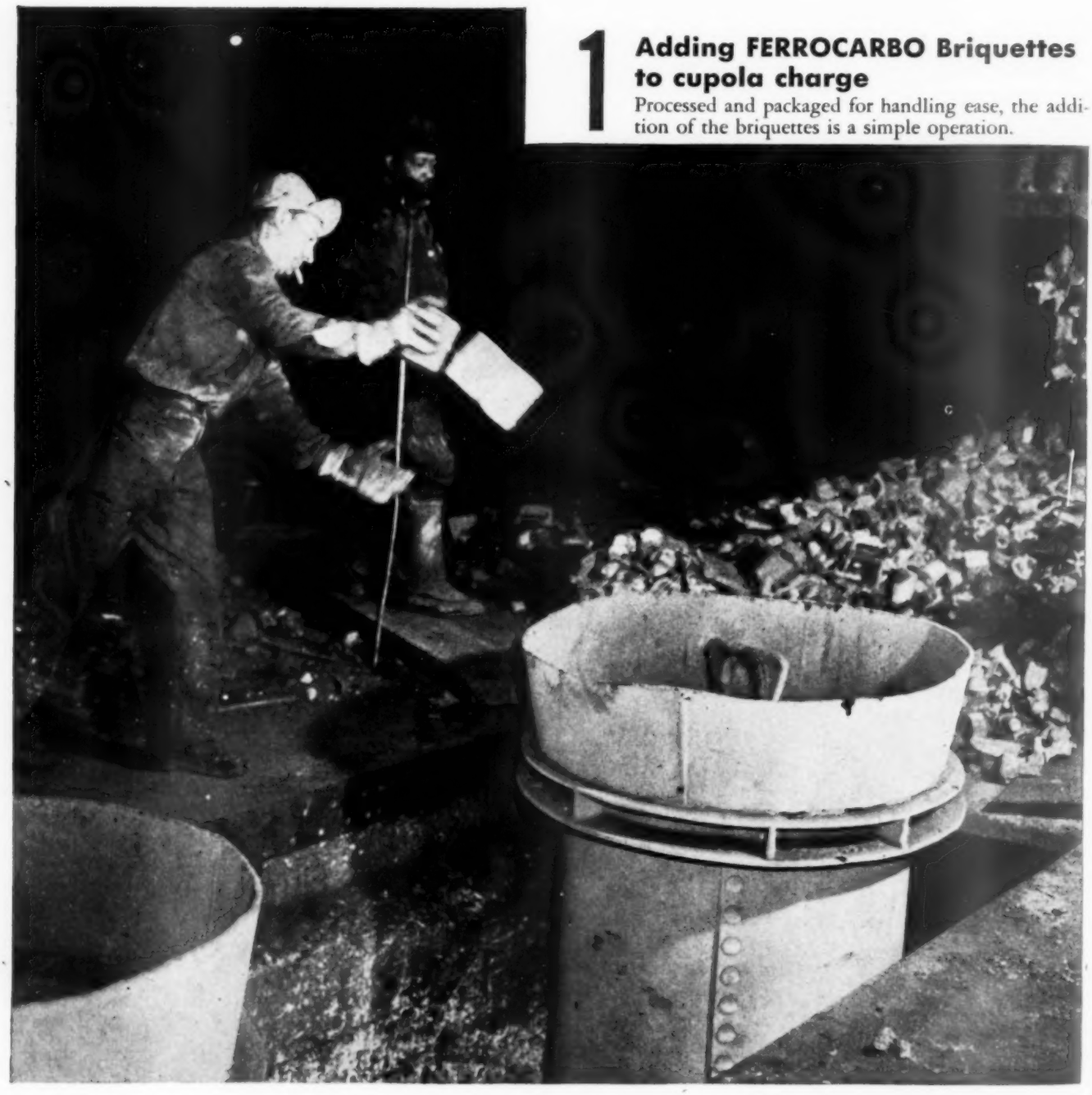
The special services of our metallurgical, foundry and sand blast engineering departments are being constantly extended. This policy of continuous betterment of product and service is your reliance in dealing with us. We hope to have your inquiries and orders for your requirements in all of the products in the Great Lakes line.

GREAT LAKES FOUNDRY SAND CO.

United Artists Bldg. • Detroit 26, Mich.

METALLURGICAL & SAND BLAST SERVICE

How FERROCARBO Briquettes BY CARBORUNDUM TRADE MARK improve Product Performance ...lower costs in Malleable Iron Melting



1 Adding FERROCARBO Briquettes to cupola charge

Processed and packaged for handling ease, the addition of the briquettes is a simple operation.

2 Iron flowing from cupola to air furnace

FERROCARBO Briquettes are a widely accepted agent for obtaining thorough degasification and deoxidation

3 Tapping air furnace

Higher metal temperature, maintained at spout through addition of FERROCARBO Briquettes, provides prolonged increases in fluidity.

4 Pouring a casting

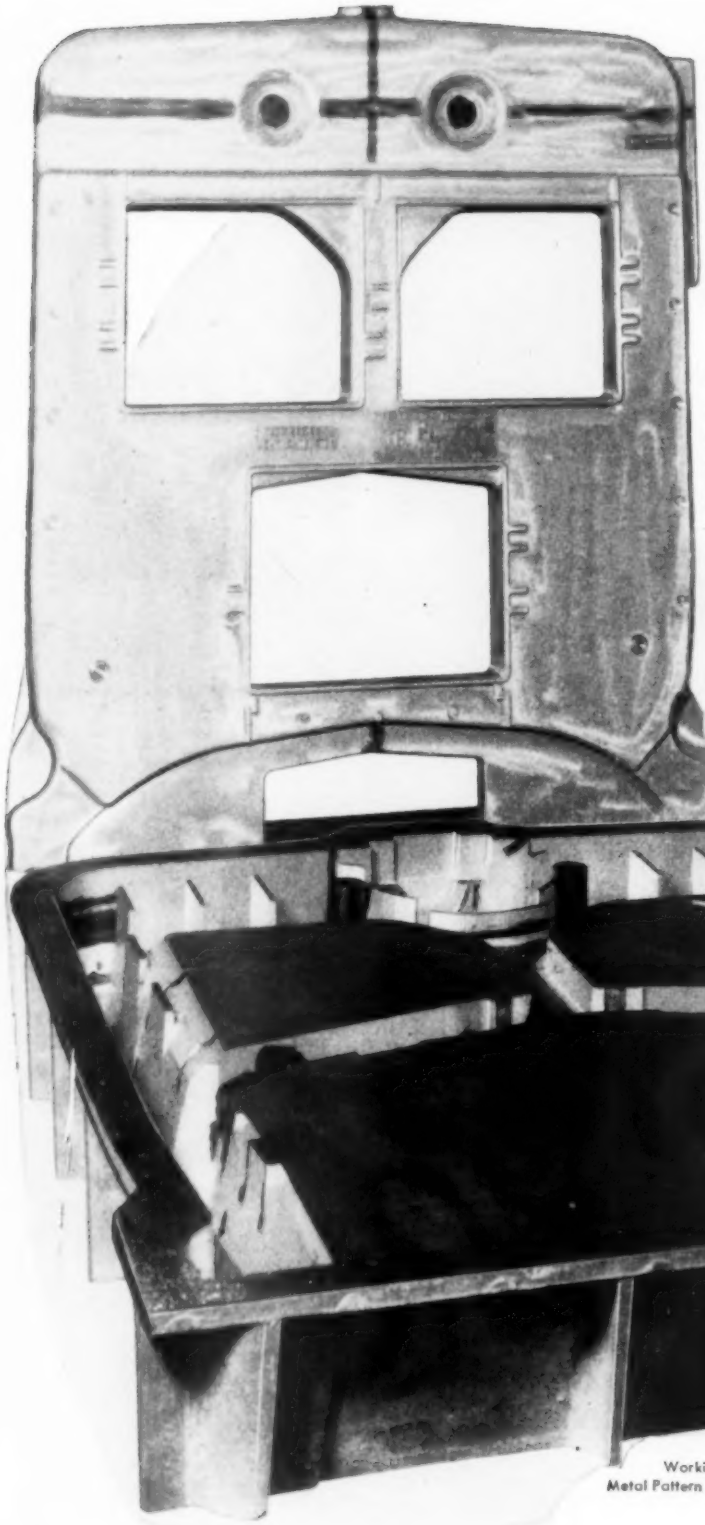
The number of shrinkage cracks and hot tears close to or where risers feed castings is reduced. Rejects are effectively minimized.

The use of FERROCARBO Briquettes is receiving increasing attention in malleable operations. It will pay to get detailed facts from our metallurgists.

THE CARBORUNDUM COMPANY, Abrasive Grain and FERROCARBO Division, Niagara Falls, New York

FERROCARBO Distributors: Kerchner, Marshall & Co., Pittsburgh, Cleveland and Birmingham; Miller and Company, Chicago, St. Louis and Cincinnati

"Carborundum" and "Ferrocarbo" are registered trademarks which indicate manufacture by The Carborundum Company



ENGINEERS and MANUFACTURERS of PERMANENT-MOLDS, WOOD and HIGH PRODUCTION METAL PATTERNS

All metal patterns of the high production type are carefully machined to a fine tolerance and guarantee a perfect reproduction, saving time and money. Quality and precision are ever the watchwords of experienced pattern engineers throughout the plant.

Working out intricate detail of a high production Metal Pattern for a steam boiler section—heavy duty type.

WOOD AND METAL PATTERNS • PERMANENT MOLDS • KELLER AND DUPLICATOR WORK • MACHINE WORK • MALLORY METALS BERYLLIUM COPPER • MONEL METAL • EVERDUR CASTINGS COPPER CASTINGS OF HIGHEST ELECTRICAL CONDUCTIVITY • BRASS, BRONZE AND ALUMINUM CASTINGS

CITY PATTERN
FOUNDRY AND MACHINE CO.

1161 HARPER
AT RIVARD
DETROIT 11,
MICHIGAN

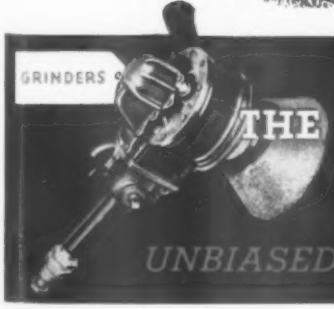
4 POUNDS LIGHTER ...TURNS OUT MORE WORK

THE new Rotor No. 44 Sand Rammer in this foundry has stepped up production because it gives a snappier, faster blow and it is easier to handle . . . 4 pounds lighter than the previous rammer.

There's a Rotor Rammer for every job . . . light or heavy duty . . . bench or floor model. Write for free copy of Bul. No. 32 which gives the whole story.

AIR O'TOOL

GRINDERS



THE ROTOR TOOL CO.

CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

RAMMERS

*It's Made its Way

By the Way it's Made

The Herman machine illustrated is our new design Special Rollover and Draw machine which is used when the molds or cores are rammed separately from the Rollover Machine.

Machines of this design can be furnished through our entire range of Rollover machines from approximately 750 pounds capacity up to and including 40,000 pound rollover capacity at 80 pound air pressure.

The photograph illustrates the turnover plate and pattern being rolled back to their upright position. On reaching that position, the pattern clamps will be disengaged, the pattern removed from the machine, and taken back to the ramming station for another flask. Coreboxes are similarly handled.

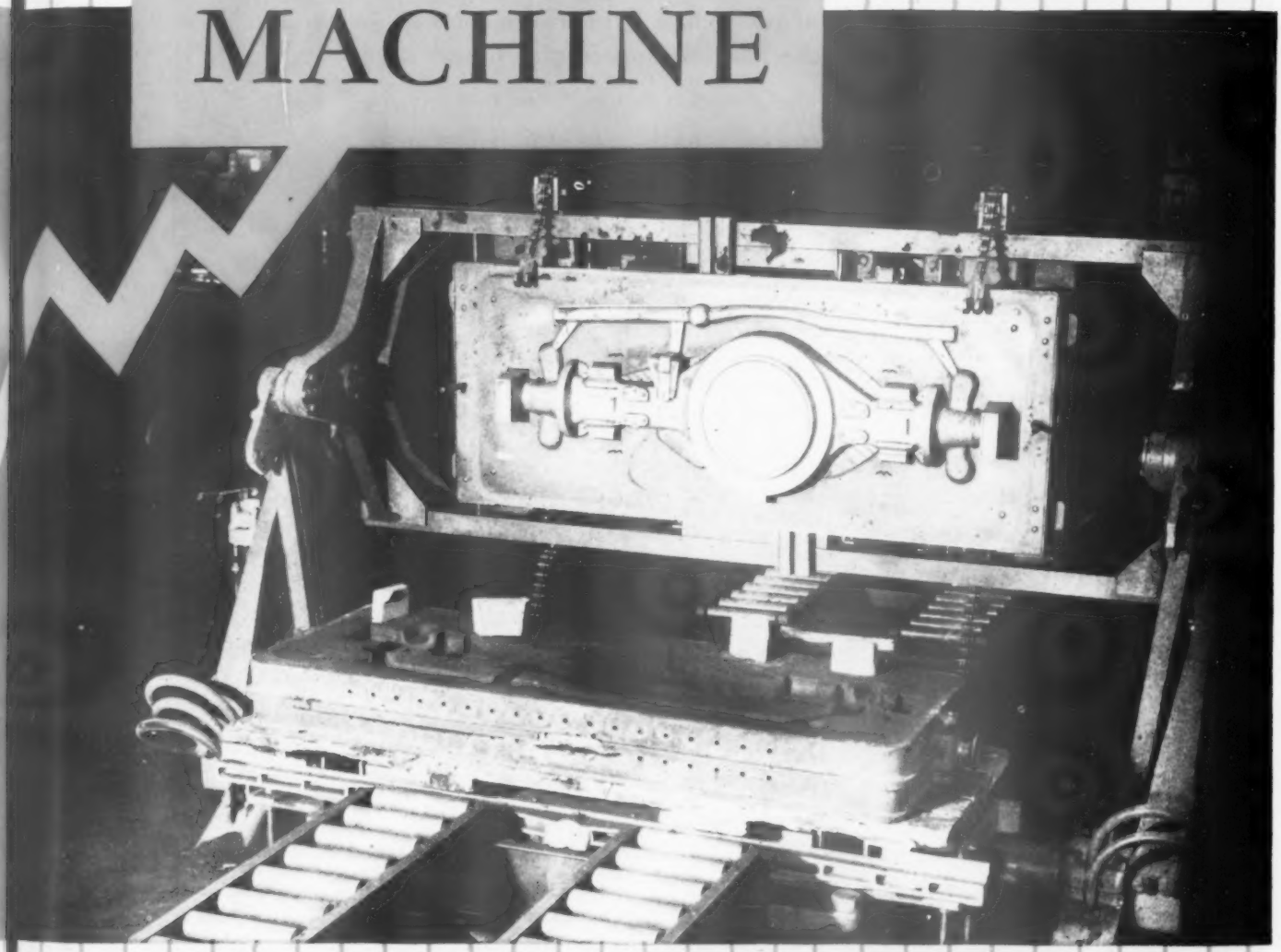
Like all Herman machines these are the product of over 40 years' experience. Close attention to quality has enabled the Herman machine to make its way by the way it's made. May we hear from you?

*And it's making the foundry everywhere A Good Place to Work

BOOTH 910
at the
PHILADELPHIA CONVENTION

H E R M A N P N E U M A T I C M A C H I N E C O.

the HERMAN MOLDING MACHINE



HERMAN MOLDING MACHINES

UNION BANK BUILDING, PITTSBURGH, PA.

AN *Announcement*

TO GRAY IRON PRODUCERS AND THEIR CUSTOMERS

Gray Iron Founders' Society, Inc., representing an industry with some two billion dollars of annual sales, has embarked upon a long-range program of research, self improvement and expansion commensurate with the limitless opportunity it sees ahead.

Fundamental in this program are plans for:

1. Assistance to users and potential users of Gray Iron in making their products better, in lowering their costs, or both.
2. Consultation and service to help members improve their products and their processes.
3. Education—within the membership, in technical schools and throughout industry as a whole—on the uses and characteristics of Gray Iron components.

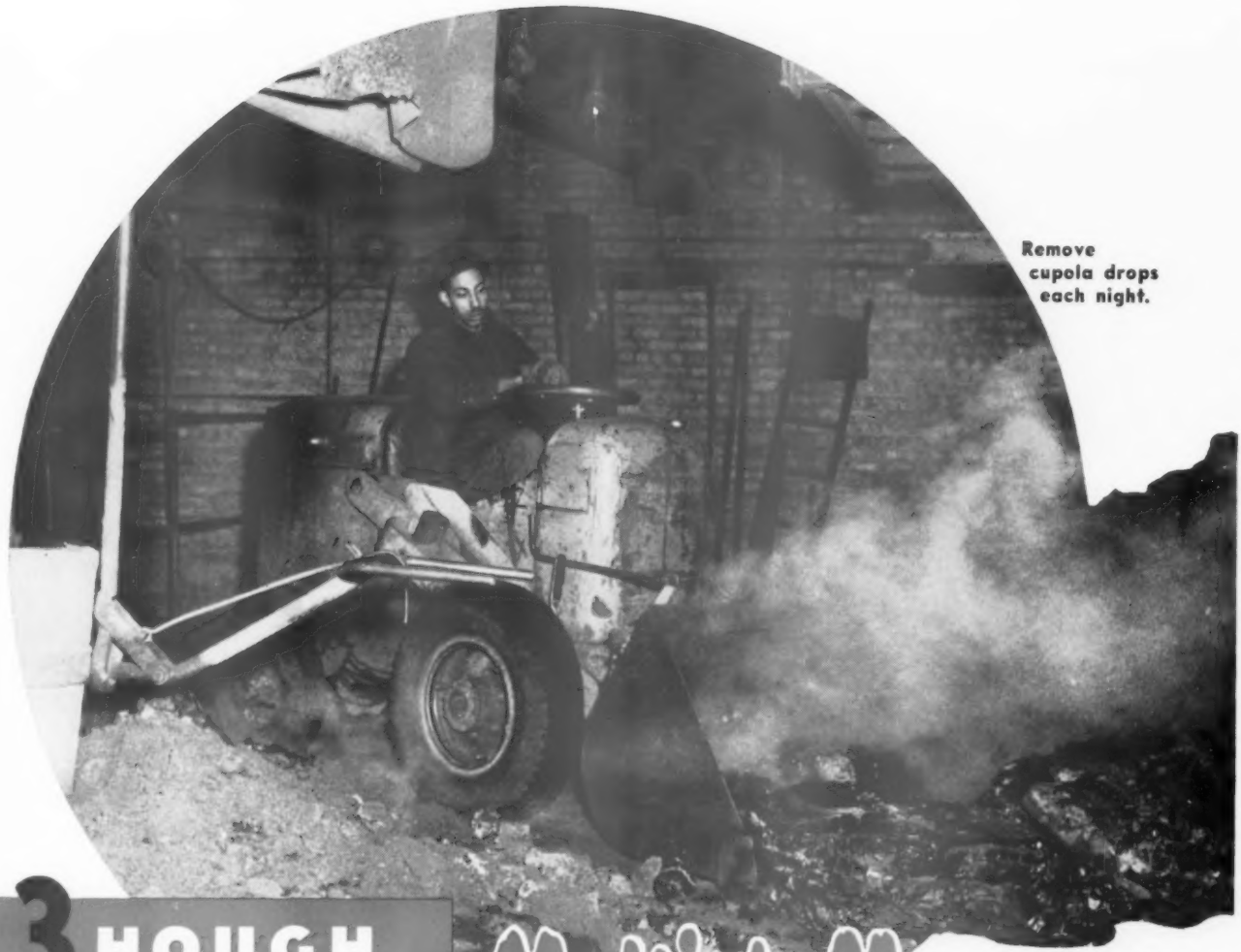
This is the first of a series of messages to appear each month in a number of business papers.

Gray Iron Characteristics Include:

- Abrasion and wear resistance
- Corrosion resistance
- Machinability
- Damping capacity
- Heat resistance
- Rigidity
- Low notch sensitivity
- Durability
- Castability—dimensional accuracy
- Wide selection of mechanical properties

"MAKE IT BETTER WITH GRAY IRON"

GRAY IRON FOUNDERS' SOCIETY, INC. *33 PUBLIC SQUARE CLEVELAND 13, OHIO*



Remove cupola drops each night.

3 HOUGH SAY "HUFF" PAYLOADERS

PATENT 2,412,323

Multiply Manpower

at Greenlee Bros. Tool Company . . .

Windrow sand for the cutter.

Negotiate 55-inch wide entrance and 30 degree ramp in sand bins.

see our exhibit at the Foundry Show, Space No. 816.

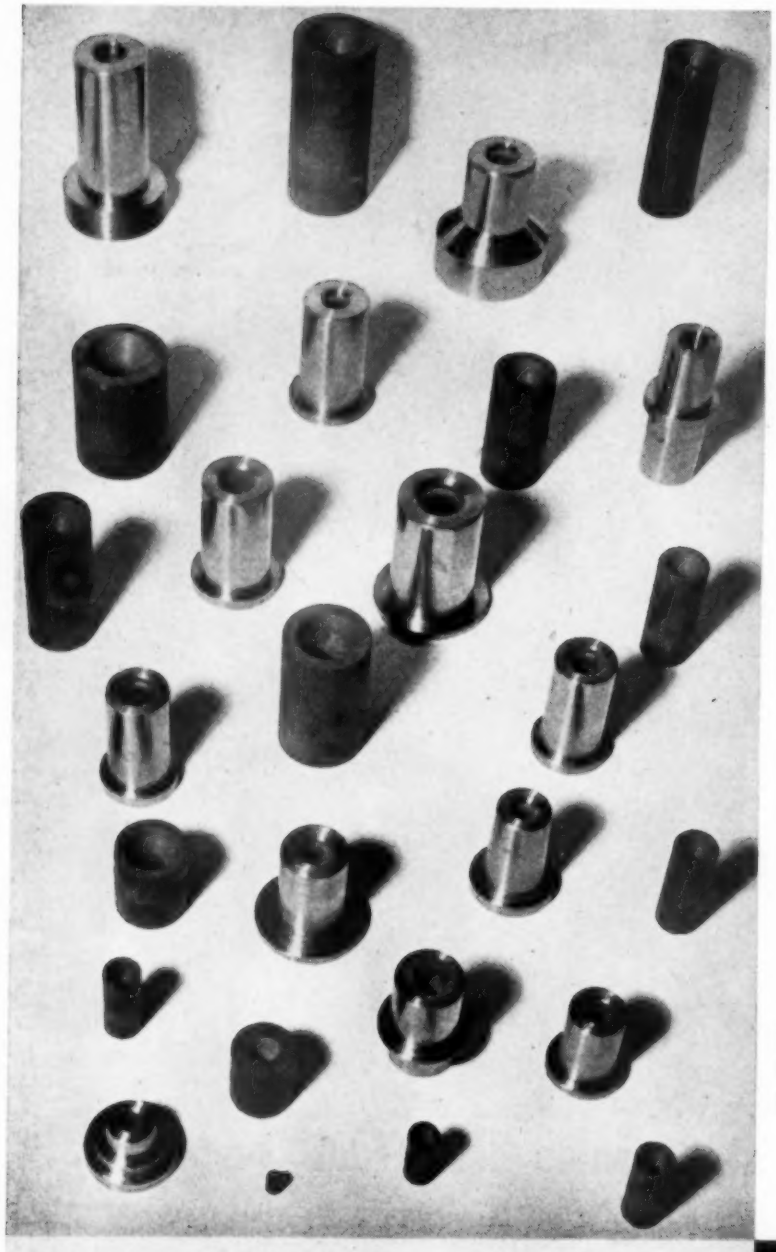
The installation of three Hough Model HA Payloaders at the foundry of Greenlee Bros. Tool Co., Rockford, Ill., has greatly increased production, saves 64 man hours of labor per day, saves time on many operations. The machines deliver sand from storage bins to molding stations, unload box cars of sand and haul it 150 feet to storage bins, move 2½ tons of limestone and 10 tons of coke each day from storage to cupola on a 400 foot round trip. They also windrow all used sand for the sand cutter, return sand to reclaiming room after cutting, remove cupola drops each night, charge hopper of facing mixer machine, do general clean-up, clear gangways and shovel snow.

This Greenlee record is typical of Payloader accomplishments in hundreds of other foundries . . . of how these rugged, compact, mobile machines cut costs, save time, save manpower and increase production. It will pay you to get Payloader facts. Write today for literature on the 10½ cu. ft. Model HA and larger Payloaders, also the 2-yard Payloader Buggy.

THE FRANK G. HOUGH CO.

703 SUNNYSIDE AVENUE **7H** *LIBERTYVILLE, ILLINOIS*

TRACTOR SHOVELS SINCE 1920



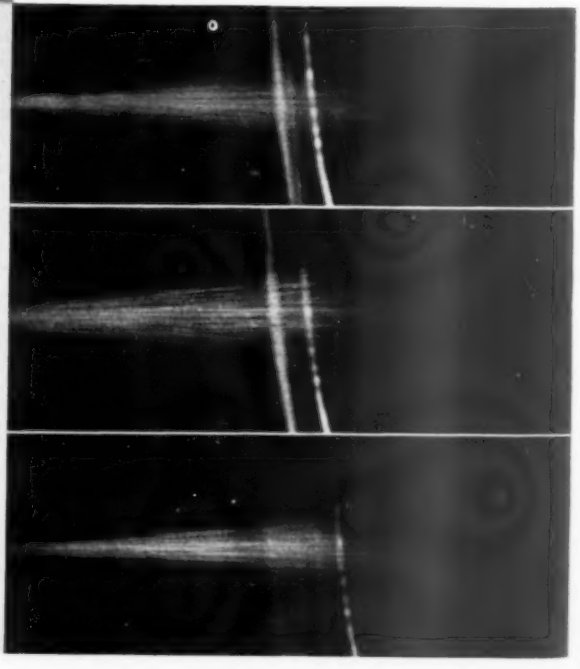
For Savings and Service
NORBIDE® *Blast Nozzles*

HERE ARE THREE GOOD REASONS why it pays to purchase NORBIDE pressure blast nozzles:

1. They give more service per dollar cost than any nozzle now available—guaranteed to give 750 hours with silica sand and 1,500 hours with steel grit before the orifice diameter enlarges one and one-half times. One NORBIDE nozzle will often outwear 1,000 iron ones.
2. The wear-resistance of NORBIDE nozzles decreases air consumption from 10% to 20% as compared with iron nozzles because the nozzle retains its original orifice for a long period of service.
3. NORBIDE nozzles increase production and improve blasting efficiency. Time is *not* lost for frequent changes of worn-out nozzles. And because the nozzle orifice is not readily worn larger, abrasive velocity remains more uniform with the maximum of cleaning efficiency and economy.

NORBIDE nozzles are made of Norton Boron Carbide—the hardest material made by man.

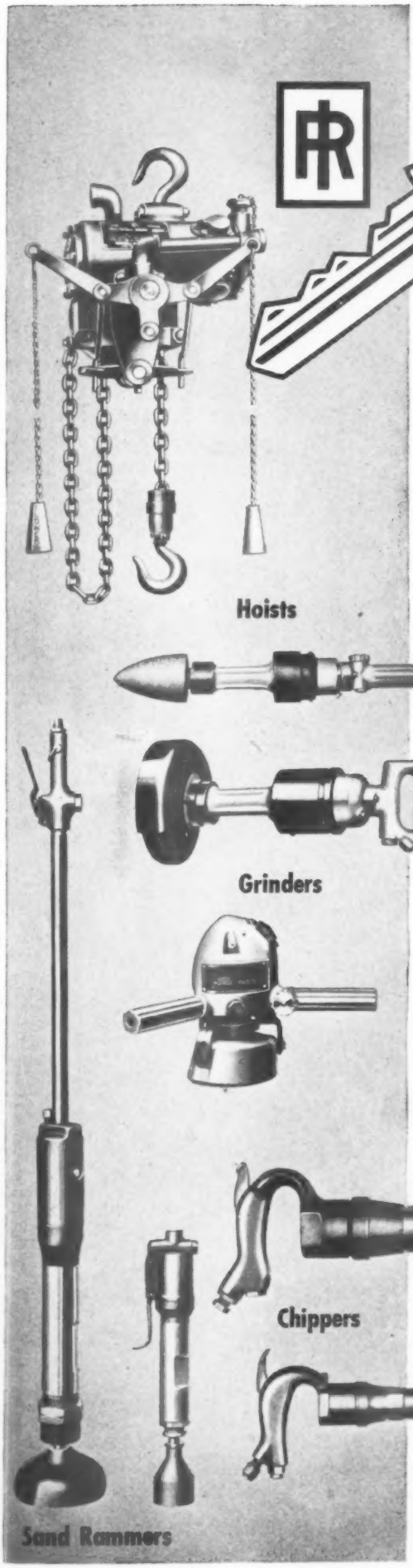
NORTON COMPANY
Worcester 6, Massachusetts



High-speed photograph of stream from new iron nozzle—note that stream concentration and abrasive velocity and volume are fair

Stream from the same nozzle after three hours with silica sand. Outlet opening worn to twice original size—stream concentration poor, abrasive velocity and volume low

Stream from Norbide Nozzle after 404 hours with sand—outlet diameter worn only 0.032"—hundreds of hours of useful life remain—marked stream concentration—high abrasive velocity and volume



KEY to Success

Success means
doing a *better* job. You can turn out better jobs
quicker and at less cost,
if you figure your job with
I-R Air Tools.

Ingersoll-Rand Air Tools give you
operator control—
instantaneous (or gradual) starting and stopping.
In addition,
they are light in weight, easy to handle,
and reduce operator fatigue.
Their durability, flexibility, and
control insure superior work with
reduced maintenance and operation costs.

Your jobs will be *better*
and more profitable with I-R Air Tools.
For complete information,
consult our nearest representative.

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

178-8

COMPRESSORS • CONDENSERS • TURBO BLOWERS • CENTRIFUGAL
PUMPS • ROCK DRILLS • AIR TOOLS • OIL AND GAS ENGINES

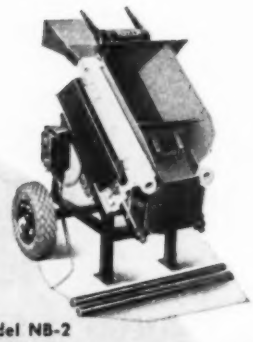
Around the Clock SAVINGS

with

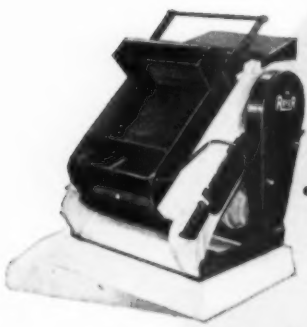
Model D Special
20 to 25 tons
per hour

Model R Special
40 to 50 tons per hour

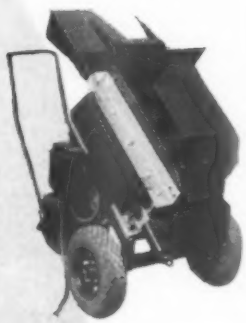
The Royer Junior
4 to 7 tons per hour



Model NB-2
7 to 9½ tons
per hour

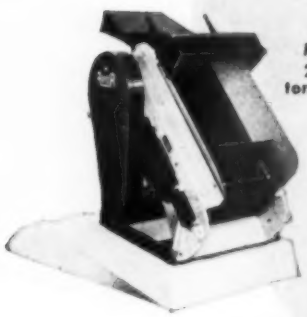


Model NRS
40 to 50
ons per hour

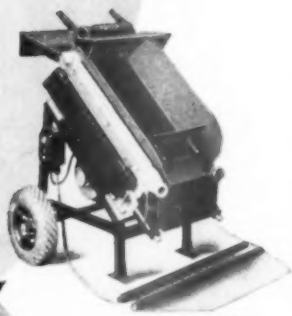


Model NB-4
7 to 9½
tons per hour

ROYER

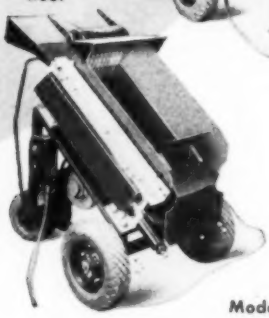


Model NDS
20 to 25
tons per hour



Model NC-4
12 to 15
tons per
hour

Model NDP
20 to 25 tons
per hour



Model NC-2
12 to 15 tons
per hour

Model RC Combination
40 to 50 tons per hour

Send for Bulletin 744

Find out about the Royer method of low-cost, top-quality sand preparation. Send for this free bulletin giving complete details of construction, operation and installation.

Model NDC Combination
20 to 25 tons per hour

the ROYER Sand Separator and Blender

In a Chicago Foundry Model NC-2 conditions 12 to 15 tons per hour.

Key Point of Foundry Production

Somewhere . . . . night and day, every hour of the 24 . . . ROYER SAND SEPARATOR AND BLENDERS are busy doing a vital job for the foundry industry . . . keeping production rolling through proper sand preparation.

ECONOMY. One man, with a Royer, can condition enough sand in a few minutes to keep a crew of molders busy for hours. He simply shovels into the low hopper . . . and the Royer does the rest of the job . . . automatically, efficiently, accurately. What an improvement over slow, wasteful, hand blending and riddling!

QUALITY. *And what an improvement in the sand!* The Royer turns out an evenly blended and moistened, thoroughly aerated, refuse-free sand you simply cannot get any other way. No wonder Royer users get such smooth surfaced castings . . . with so little after-machining to be done . . . and so few rejects due to skids, drops, scabs, runouts and other defects!

SIMPLICITY. Anyone who can shovel can operate a Royer. Material in the hopper falls onto a moving belt studded with chrome molybdenum steel teeth. Automatically the belt action combs and blends old sand, new sand and bond . . . breaks up lumps and clay balls . . . distributes moisture evenly . . . double aerates, cools and de-gasses the sand . . . discharging it into piles where needed. Burnt cores, wedges, scrap are emptied from the lower end.

POPULARITY. Today nearly 8,000 Royers are in use. Many have seen heavy service daily for 10 to 15 years. Half are repeat purchases from plants the Royer economy has helped expand. Royers are available in capacities from 4 to 50 tons per hour, in self powered and stationary models. Send for Bulletin 744 for details.

Something New! Something Revolutionary!

See It for the First Time at Your 1948 Foundry Show in Philadelphia. Don't Miss Royer Booths 1030, 1031, and 1131!

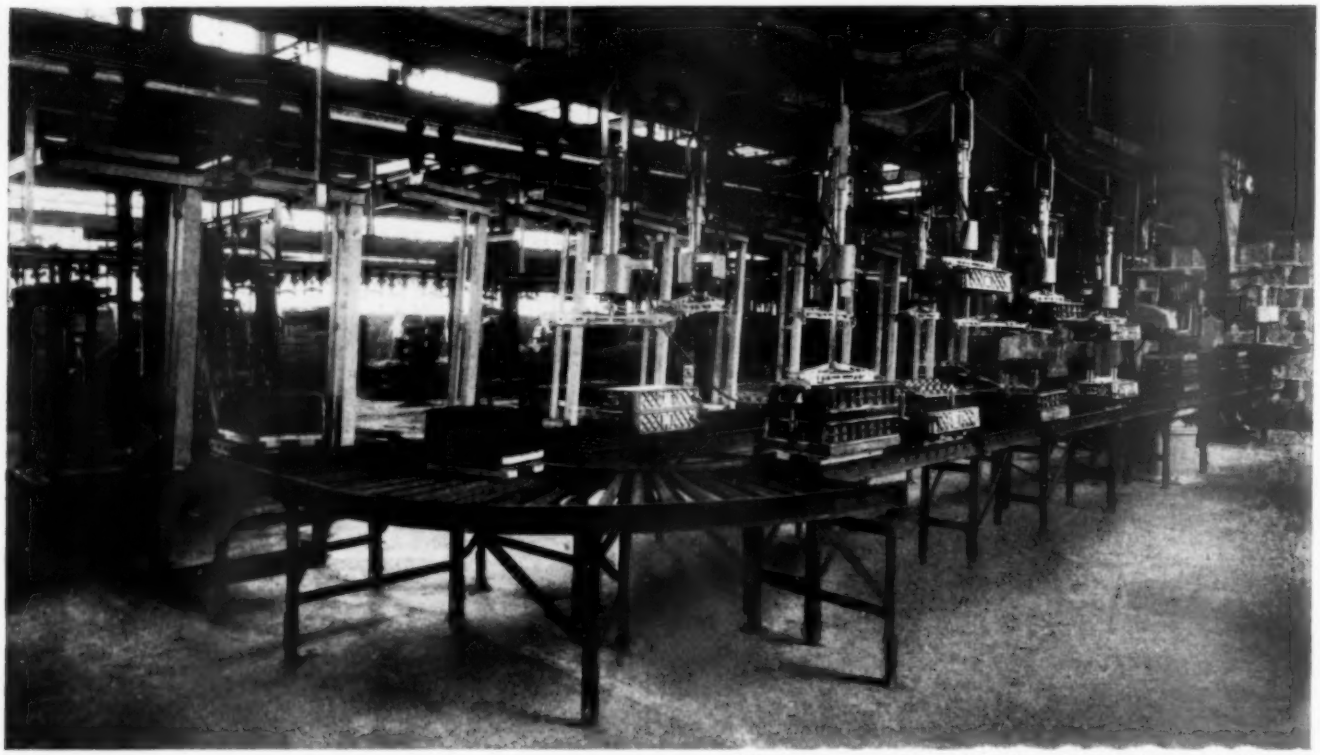
ROYER

FOREMOST IN SAND CONDITIONING EQUIPMENT

ROYER FOUNDRY & MACHINE CO.

155 PRINGLE ST., KINGSTON, PA.

GET THE RESULTS



Photograph courtesy of Sterling Casting Corp., Bluffton, Ind.

LEARN WHAT CAN BE ACCOMPLISHED WITH PROGRESSIVE MOLDING

MAXIMUM PRODUCTION
FROM
INEXPERIENCED MEN
WITH
MINIMUM EFFORT
AT
LOWEST COST

MEMBER
MANUFACTURERS' ASSOCIATION INC. FOUNDRY EQUIPMENT

VISIT BOOTH NO. 122

SIMPLE MOLDING UNITS F COMPACT EFFICIENT

THE FELLOWS CORPORATION

1012 NORTH THIRD STREET • MILWAUKEE, WISCONSIN

PERFECT LINE UP of cope and drag with UNIVERSAL FLASK PINS and BUSHINGS

If you're having trouble with cope and drag line-up on your casting production line and are losing valuable time and metal as a result, *it will pay you to investigate* Universal Flask Pins and Bushings. Precision-made in various standard sizes and shapes, Universal Flask Pins and Bushings can be readily installed in flasks *to insure positive alignment* with minimum effort. Cope bushings are quickly guided to the drag pins over a tapered, loose-fitting closing pin which is easily removed after assembly. Round or elongated bushings and round pin design permits longitudinal expansion resulting from metal heat. *Hardened and ground for lasting accuracy and maximum wear resistance.* Write for folder.

UNIVERSAL ENGINEERING COMPANY • FRANKENMUTH 4, MICHIGAN

SWAN-FINCH CASE HISTORY No. 259
(name on request)
Product:
Core Mix:
Gray Iron Cylinders
1200 lb. Michigan City Sand
12 lb. cereal binder
4.5 qt. TYKOR Liquid Core compound
4.5 qt. Safco 412 core oil
8 qt. water
Baking Time:
1 hour, 45 minutes
Advantages:
As compared with mix previously used, 35% reduction in baking time, easier shakeout, easier ramming, better blowability, cleaner working in core boxes, better permeability, reduced gas evolution, smoother cores.
Extra Benefits:
50% saving in cereal binder — 18% cost saving in liquid binder.

better cores with TYKOR

MEAN BETTER CASTINGS FOR YOU

The case history above, taken at random from the Swan-Finch files, shows an amazing list of advantages gained at a large gray iron foundry, by using TYKOR liquid core compound and Safco 412 core oil. These advantages . . . resulting in better castings . . . were obtained when a Swan-Finch engineer made his core mix tests.

Why not make it a point to discuss your core room problems with our representatives at the Foundry Show, May 3-7. See them at Booth 126. Or ask a Swan-Finch man to call at *your* plant. Through his experience with problems like yours and the ability to put this experience to work, he can effect similar results in your operation.

Booth 126
Foundry Show

Reg. U. S. Pat. Off.

SWAN-FINCH OIL CORPORATION
CHICAGO • DETROIT • NEW YORK

4182

NEW *Giant* *Model No. 50*

CAST-MASTER

DIE CASTING MACHINE

...produces heavy and outsize castings

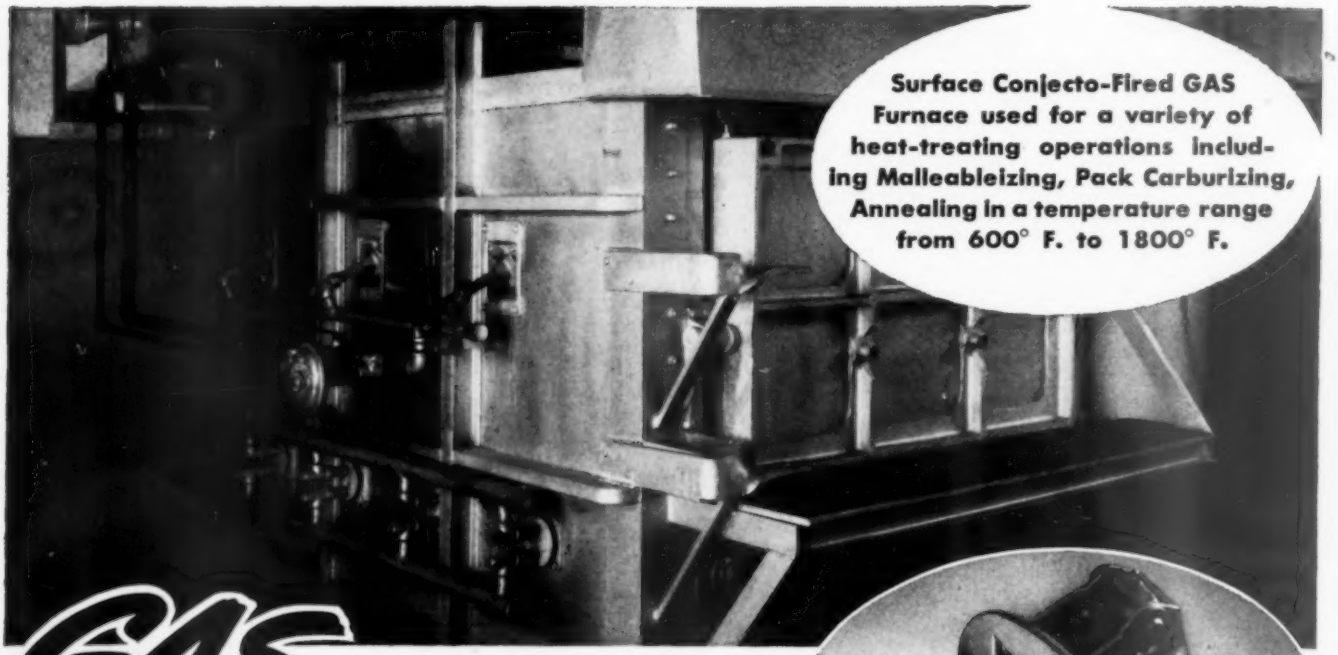
— New ty
adjustable sh
cylinder suppo
Minimizes defl
tion even und
maximum sho
ing pressure.

Now turning out Automobile grills and panels, Washing Machine Agitators and other large castings with the same efficiency and speed as machines producing lighter castings.

A giant in size, efficiency and speed. The model No. 50 CAST-MASTER embodies many outstanding features that make it exclusive in its class. New type dual pump set-up practically doubles performance; dual moveable plate carrier. Shot cylinder adjustable for 1½" to 9" cover dies using one plunger tip; all leak-proof, high pressure swivel joints — no rubber hose connections to leak or break. These, and many other efficiency-producing features make this newest CAST-MASTER model the fastest of its kind in the field today.

Its huge size lends exceptional rigidity and eliminates spitting even on largest castings. All controls are on the operating side.

MILLER-TAYLOR TOOL CO. 5005 Euclid Ave., Cleveland 3, Ohio



Surface Conjecto-Fired GAS Furnace used for a variety of heat-treating operations including Malleableizing, Pack Carburizing, Annealing in a temperature range from 600° F. to 1800° F.

GAS FURNACE PERFORMS MULTIPLE HEAT-TREATING FUNCTIONS UNDER VARIED CONDITIONS

In modern heat-treating, adaptability of equipment and flexibility of fuel are primary influences in any cost-per-piece analysis. As a typical example of the flexibility of the productive flames of GAS, this Conjecto-Fired GAS Furnace is used for a variety of operations without any change other than regulation of the fuel-mix and temperature controls.

Atwood Vacuum Machine Company, Rockford, Illinois, is equipped to heat-treat pieces ranging from 1 ounce to 1000 pounds, in volume up to 15,000 pounds daily. Their modern Gas-fired Equipment is adapted for annealing, carburizing, drawing, hardening, normalizing, malleableizing, stress relieving, under rigid metallurgical specifications.

Experienced heat-treating specialists like Atwood Vacuum Machine Company use GAS because this flexible, controllable, rapid-heating fuel is so readily adaptable to all types of processing at any required temperature.

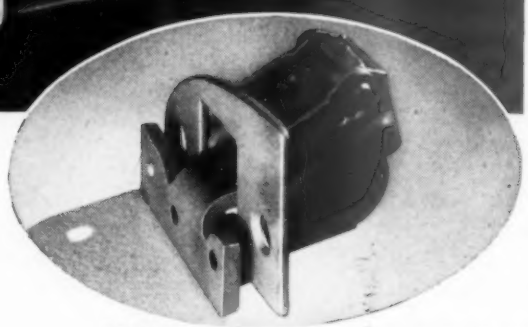
You'll find an interesting American Gas Association Exhibit at THE FOUNDRY SHOW—Convention Hall, PHILADELPHIA, MAY 3-7, 1948

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE • NEW YORK 17, NEW YORK

Data and Photos by SURFACE COMBUSTION CORPORATION, Toledo, Ohio, Manufacturers of Gas Heat-Treating equipment

MORE AND MORE... THE TREND IS TO GAS FOR ALL INDUSTRIAL HEATING

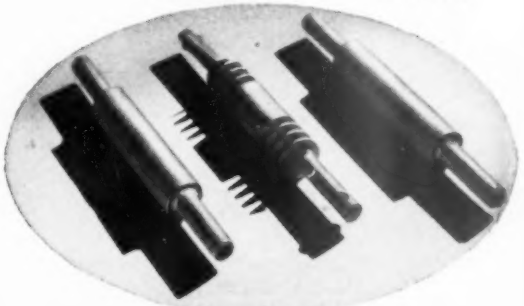


***ANNEALING*—Station wagon body hinge**

Material:	SAE 1020
Temperature:	1600° F.
Time Cycle:	36 hours
Net charge:	6400 lbs.

***PACK CARBURIZING*—Brake Trunnions**

Material:	Hot rolled SAE 1010
Temperature:	1650° F.
Time Cycle:	8 hours
Case:	.040
Net charge:	1500 lbs.



***MALLEABLEIZING*—Trailer Jack Screws**

Material:	Malleable Iron
Temperature:	1750° F.
Time Cycle:	72 hours
Net charge:	10,000 lbs.

Pangborn Dust Collector Salvages $5000 Yearly For Dodge Cork Co.

Pangborn CH Collector salvages cork dust from sawing and polishing machines at plant of Dodge Cork Co., Lancaster, Pa.

"...From 40 sawing and polishing machines the Pangborn collects over 99% of the dust produced ...dust which formerly was swept up and burned is now bagged by our Pangborn Collector—and sold at a profit."

Dodge Cork Company, of Lancaster, Pa., installed a Pangborn "CH" Dust Collector two years ago to collect waste cork residue resulting from grinding, sawing and polishing about two million corks daily. Three to four 100-pound bags of cork dust, worth $140 a ton in resale, are salvaged every day. The Pangborn Collector actually salvages *$5000 a year* for the company, has already "paid for itself twice over," claims the Dodge production manager. Maintenance costs are negligible.

A Pangborn "Dust Pocket Survey" of your plant may reveal similar opportunities to turn dust losses into profits . . . by removing costly dust entirely, by reclaiming it and putting it to profitable use. This survey, by experienced Pangborn engineers, is yours for the asking. Why not find out if Pangborn Dust Control can pay dividends for you? Write for FREE information to: Pangborn Corporation, 300 Pangborn Blvd., Hagerstown, Md.

PANGBORN STOPS THE DUST HOG
from stealing your profits

Pangborn
DUST CONTROL
TURNS DUST LOSSES INTO PROFITS

WE'RE COMING ARMED

...armed with facts and testimonials to show you how foundries produce better castings at lower cost by using

Famous CORNELL Metal FLUXES

FAMOUS FOR OVER 30 YEARS —NOW BETTER THAN EVER!

We have found rare and invaluable minerals in our mines, which have made Famous Cornell Fluxes still more effective in cleansing molten metal.

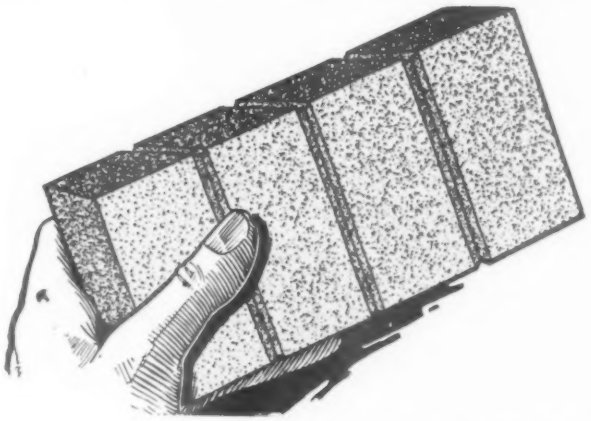
Booth 1103

Mfrs. of IRON, SEMI-STEEL, MALLEABLE, BRASS, BRONZE, ALUMINUM, and LADLE FLUXES -- Since 1918

The CLEVELAND IRON & MFG. CO.

1026-1036 MAIN AVE., N.W.

TO PHILADELPHIA--



Famous CORNELL CUPOLA FLUX

IN EXCLUSIVE SCORED BRICK FORM

The quality of castings is measured by the purity of the iron that comes from cupola. And in-as-much as every cupola charge contains foreign matter, regardless of how carefully pig, scrap, etc. is selected, it will pay you to follow the example of leading foundries (names on request) by using Famous Cornell Cupola Flux regularly to cleanse molten metal and get the best castings.

Famous Cornell Cupola Flux not only purges molten iron of impurities, but makes it hotter and more fluid. You will pour castings that are stronger, sounder, denser grained, cleaner and easier to machine.

Famous Cornell Cupola Flux keeps cupolas cleaner, cuts maintenance time and labor. Bridging over is practically eliminated. Drops are cleaner.

Famous Cornell Cupola Flux prolongs the life of cupola lining by forming a glazed or vitrified surface on brick over and above the melting zone.

THE SCORED BRICK FORM SAVES TIME AND LABOR IN USING AND ELIMINATES WASTE.

Under average conditions, you simply toss one brick of Famous Cornell Cupola Flux into cupola for each ton charge of iron or break off a briquette (quarter section) for each 500 lb. charge. This flux does not blow out with the blast but STAYS in melting zone until entirely consumed.

Write for Bulletin 46-B

Famous CORNELL BRASS FLUX

CLEANSES MOLTEN BRASS. MAKES CASTINGS BETTER even when dirtiest brass turnings are used. Castings come tougher, sounder and denser grained, which is very essential in the manufacture of any casting that must stand the pressure test and take an extra fine finish.

Several elements in this flux combine to gather the gases while the metal is being melted, and cause them to form into balloon shaped bubbles and rise to top of metal. The slag is very essential as a cover to retain heat during melting process.

Less tin and other metals are required.

Crucible and furnace linings are preserved.

Write for Bulletin 46-A

Famous CORNELL ALUMINUM FLUX

CLEANSES MOLTEN ALUMINUM. MAKES CASTINGS BETTER. Removes all foreign matter, enabling you to produce sounder, tougher castings.

More scrap can be used without danger of porous or spongy spots in castings.

Thinner yet stronger sections can be poured.

NO FUMES! Exclusive formula prevents obnoxious gases and improves working conditions.

Metal does not cling to dross.

Write for Bulletin 46-A

NIFLUX *Company*

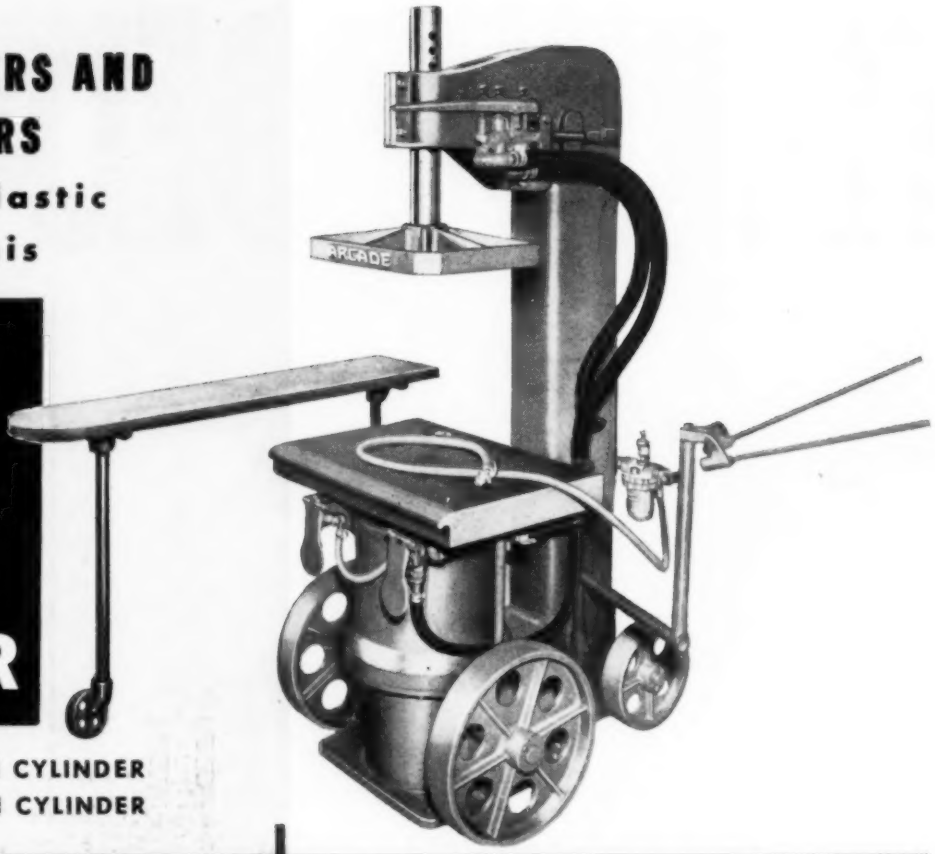
AVIN.W., CLEVELAND 13, OHIO

FAMOUS CORNELL FLUXES

Trade Mark Registered

***Both* MOLDERS AND MANAGERS**
are enthusiastic about this

NEW ARCADE JOLT SQUEEZER



No. 100 WITH A 10-INCH CYLINDER
No. 120 WITH A 12-INCH CYLINDER

"Best machine I ever used!"
says every molder who has used it.

They like the way it minimizes manual effort required to produce the maximum number of molds.

They like the attention given to details that make for easier handling of molds.

They like the ease with which the balanced arm swings back and forth at a light touch.

They *like* it!

WRITE FOR BULLETIN 120—full details; and continue to expect important developments at Arcade.

Production men like it, too—
men who keep watch of costs.

They like its flexibility of design—the interchangeability of cylinders, from 10-inch to 12-inch or vice versa; and the easy switch from portable machine to stationary, by removing the wheels and bolting down; or vice versa.

They like the rugged construction and clean simplicity—a machine built to stand up throughout a long, economical life.

They like its minimum number of working parts—low maintenance.

They *like* it!

50 years of continuous molding machine manufacture

ARCADE

MANUFACTURING DIVISION
ROCKWELL MANUFACTURING COMPANY
FREEPORT, ILLINOIS

Convention Points Way To Future Progress

PRODUCING better castings at lower costs is the foremost problem of the foundry industry. While shortages of metallics, coke and other materials seem critical at the moment, the influence of these factors should not extend over too long a period. But the possibility of improving both methods of production and the quality of castings provides great potentials for the further progress of the foundry industry.

Whatever may be the trend of future world events, great quantities of castings will be needed. If this nation can overcome a paucity of leadership and find the key to world peace, the needs for castings probably will exceed anything yet experienced. If the leaders of this great nation fail in their sacred duty to win the peace, the foundry industry will see the problems of 1941-1945 re-enacted—with new trends and greater emphasis.

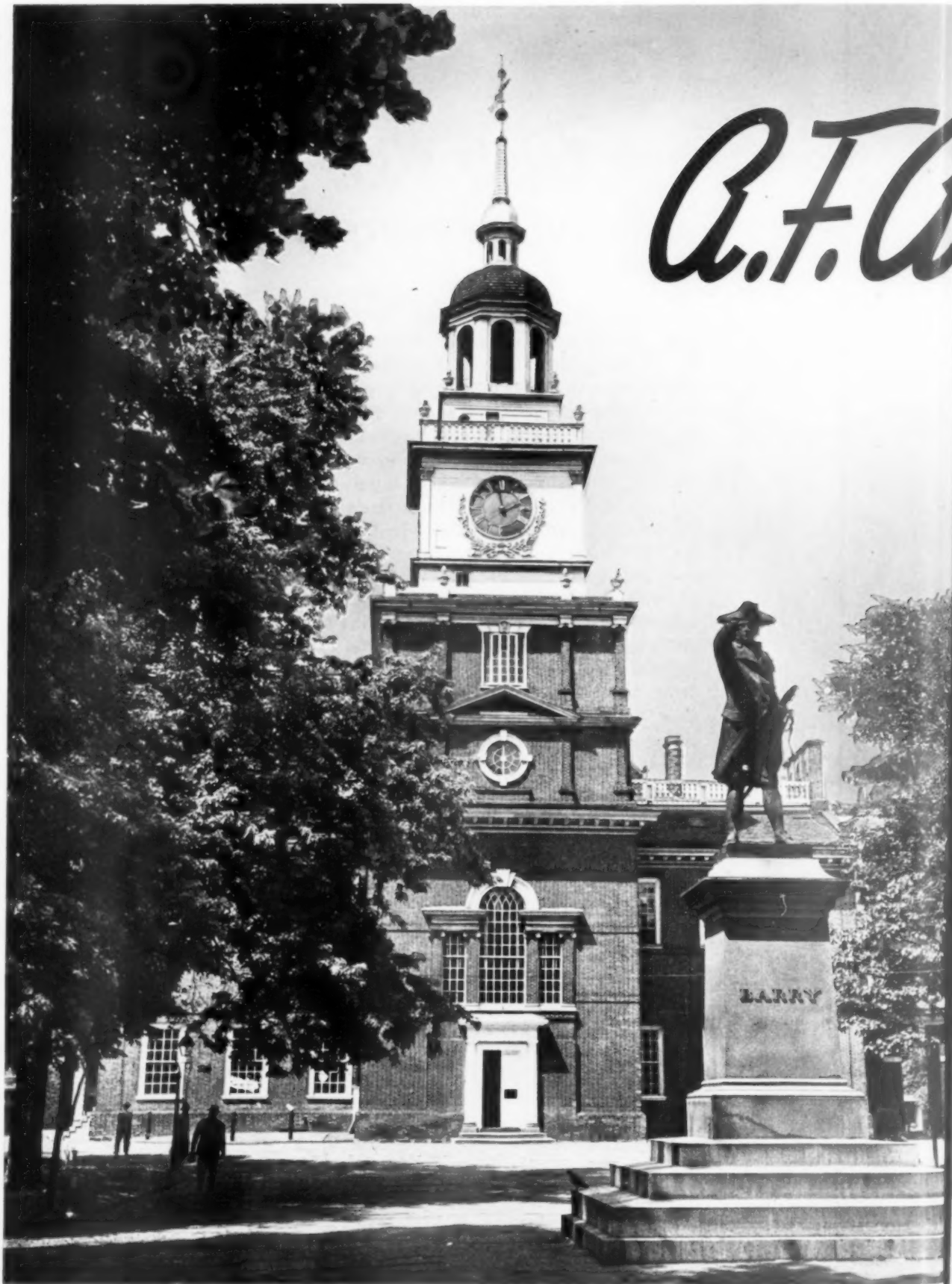
These important problems dealing with the future welfare of the castings industry will provide the keynote for the 52nd annual convention of the American Foundrymen's Association and the exhibition of foundry equipment and supplies which will be held in Philadelphia, May 3 to 7. The technical program of the convention will be devoted to consideration of new and improved practices, to developments in quality controls, and to the resultant improvements in all types of castings. An exceptional collection of high-grade technical papers covering a wide variety of interesting foundry subjects, will record recent progress in the manufacture of castings, and will chart the lines of future development work. Round-table discussions and shop courses again will permit an exchange of practical ideas which should prove valuable to all participants.

The Foundry Show will be one of the largest and most interesting in recent years. Manufacturers of machinery and materials used by the foundry now have had sufficient time since the end of the war to perfect new equipment and supplies, and to complete improvements on existing lines. For this reason, the 1948 Philadelphia convention may set a record in the number of new items which have been introduced during a two-year period. These developments will point the way to the new and better foundry industry of the future.

Foundrymen of America cannot afford to miss the Philadelphia convention and exhibition of the AFA if they wish to be successful in meeting tomorrow's problems.

Frank G. Steinebach
Editor

THE FOUNDRY—WHEREVER METALS ARE CAST



Independence Hall, one of the many famous and historic landmarks which attract the interest of visitors to Philadelphia

(Convention photos courtesy of Philadelphia Convention and Visitors Bureau)

Meets in Philadelphia

RETURNING to the site of its founding 52 years ago, the American Foundrymen's Association will meet in Philadelphia May 3 through 7. The 1948 convention, combining a five-day program of technical discussions with an extensive exhibit of foundry equipment, supplies and services, will present the newest in techniques, practices and plant facilities for the production of highest quality castings at lower costs.

Philadelphia's Municipal Auditorium and adjoining Convention and Exhibition halls will be the center of most of the week's activities. Registration of delegates will be conducted only at the main entrance, which is on the 34th street side of the auditorium. However, ladies attending the convention will register at the Bellevue-Stratford Hotel. All daytime meetings of the congress will be held in the auditorium, and those of the evening at downtown hotels. The Foundry Show will be housed in the Convention and Exhibition halls.

Comprehensive Technical Program Arranged

The AFA will maintain its headquarters in the center hall of the auditorium, between Convention and Exhibition halls, and the association's housing bureau will have its headquarters in the offices of the Philadelphia Convention and Visitors Bureau, Seventeenth and Sansom streets. Charles L. Todd, executive director of the Philadelphia bureau, who has been in charge of arranging accommodations for delegates, will be available to handle any last-minute changes.

Committees appointed by the Philadelphia Chapter of the AFA have been active in various arrangements for convention functions, including a program of entertainment for ladies and a program of plant visitations. Details of both are presented elsewhere in this issue. The chapter's Plant Visitation Committee will maintain a booth in AFA headquarters for the convenience of delegates who wish to visit plants in the Philadelphia area.

Technical program of the five-day meeting—as detailed on the following six pages—offers numerous specific and general interest sessions, instructional lecture courses, symposia, quizzes, panel and round-table discussions, studded with timely, practical papers on the most successful methods in use under today's conditions of shortages and substitutions.

Quiz-type programs at four convention sessions will give delegates an opportunity to obtain direct advice on individual problems. Written questions submitted in advance, and others raised from the floor during discussion, will be handled by panels of leaders in various sections of the industry.

Educational Division will lead off Monday morning with a six-man panel of speakers in a question-and-answer session on recruiting and training of foundry personnel; Refractories Committee will conduct its quiz on foundry refractories Wednesday evening.

Thursday afternoon the Foundry Cost Committee will present its "board of experts" on queries relating to foundry cost accounting methods, distribution of costs and application of cost data. The same afternoon Job Evaluation-Time Study Committee will feature a question-and-answer session.

Program of the Educational Division will be of particular interest, in view of recent action by the industry to further the training of foundry engineers and technologists. Members of the Monday speakers panel will include Prof. George J. Barker, chairman of the Mining-Metallurgy Department, University of Wisconsin; I. Ivan, apprentice supervisor at Whiting Corp., Harvey, Ill.; Glenn Kies, Industrial Training Service, Detroit; Henry L. Rosse, Eddystone (Pa.) Borough Schools; Fred B. Skeates, superintendent of foundries, Link-Belt Co., Chicago; Prof. R. S. Tour of the University of Cincinnati.

Chairman at the session will be Prof. William H. Ruten, head of the industrial processes department of Polytechnic Institute of Brooklyn; co-chairman, L. G. Probst, National Engineering Co., Chicago.

George K. Dreher, executive director of the Foundry Educational Foundation, Cleveland, will present "Engineering Education for the Foundry Industry" at the same session.

Other activities of the educational group during the congress include a round-table dinner Monday, the Engineering School (*Please turn to page* 169)

TECHNICAL PROGRAM

Monday, May 3

10 a.m. (A)—Aluminum and Magnesium Session
(Sponsored by Aluminum and Magnesium Division)

Presiding—L. Brown, Magnesium Fabricators Division, Bohn Aluminum & Brass Corp., Adrian, Mich. Co-chairman—A. T. Ruppe, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.

Effect of Gating Design on Metal Flow Conditions in Casting of Magnesium Alloys—H. E. Elliott, Dow Chemical Co., Bay City, Mich., and J. G. Mezoff, Saginaw Bay Industries Inc., Bay City, Mich.

A Study of Factors Affecting the Pouring Rates of Castings—H. E. Elliott, Dow Chemical Co., Bay City, Mich., and J. G. Mezoff, Saginaw Bay Industries, Bay City, Mich.

Step Aging of a Magnesium-Base Casting Alloy—E. J. Vargo, Wellman Bronze & Aluminum Co., Cleveland, and G. Sachs, Case Institute of Technology, Cleveland.

10 a.m. (B)—Educational Session
(Sponsored by Educational Division)

Presiding—W. H. Ruten, Polytechnic Institute of Brooklyn, Brooklyn. Co-chairman—L. G. Probst, National Engineering Co., Chicago.

Engineering Education for the Foundry Industry—G. K. Dreher, Foundry Educational Foundation, Cleveland.

Recruiting and Training Panel—
G. J. Barker, University of Wisconsin, Madison, Wis.
I. Ivan, Whiting Corp., Harvey, Ill.
Glenn Kies, Industrial Training Service, Detroit.
Henry L. Rosse, Eddystone Borough Schools, Pa.
F. B. Skeates, Link-Belt Co., Chicago.
R. S. Tour, University of Cincinnati, Cincinnati.

10 a.m. (C)—Malleable Session
(Sponsored by Malleable Division)

Presiding—C. F. Lauenstein, Link Belt Co., Indianapolis. Co.-chairman—W. D. McMillan, International Harvester Co., Chicago.

Effect of the Common Alloying Elements on the Tensile Properties of Malleable Iron—H. A. Schwartz and W. K. Bock, National Malleable & Steel Castings Co., Cleveland.

The Construction and Operation of an Oil Fired Malleable Iron Holding Furnace—F. Coghlin, Jr., Albion Malleable Iron Co., Albion, Mich.

Influence of Chromium on the Graphitization of White Cast Iron—Gabriel Joly, Technical Center of Foundry Industries, Paris, France—*French Exchange Paper,* presented by C. O. Burgess, Union Carbide & Carbon Research Labs., Niagara Falls, N. Y.

12 Noon—Brass and Bronze Round-table Luncheon
(Sponsored by Brass and Bronze Division)

Presiding — B. A. Miller, Baldwin Locomotive Works, Philadelphia. Co-chairman—R. J. Keeley, Ajax Metal Co., Philadelphia.

Subject—*Recent Developments in the Melting of Brass and Bronze.* Discussion leader—H. L. Smith, Federated Metals Division, American Smelting & Refining Co., Pittsburgh.

2 p.m. (A)—Aluminum and Magnesium Session
(Sponsored by Aluminum and Magnesium Division)

Presiding—C. E. Nelson, Dow Chemical Co., Midland, Mich. Co-chairman—M. H. Young, Wright Aeronautical Corp., Wood Ridge, N. J.

Can Castings Be Engineered?—F. G. Tatnall, Baldwin Locomotive Works, Eddystone, Pa.

Looking north on Broad street toward Philadelphia's City Hall

Philadelphia

4 p.m. (A)—Brass and Bronze Session
(Sponsored by Brass and Bronze Division)

Presiding—H. M. St. John, Crane Co., Chicago. Co-chairman—J. J. Curran, Walworth Co., Greensburg, Pa.

An Approach to Quality Control in Casting Production—G. K. Eggleston and V. A. Simpson, Barnes Mfg. Co., Mansfield, O.

Ingot Metal vs. Virgin Metal—F. L. Wolf, Mansfield, O.

4 p.m. (B)—Lecture Course Session
(Sponsored by Annual Lecture Committee)

Presiding—M. E. Brooks, Dow Chemical Co., Bay City, Mich. Co-chairman—David Basch, Schenectady, N. Y.

Subject—*Test Procedures for Quality Control of Aluminum and Magnesium Castings.* Discussion leader—E. V. Blackmun, Aluminum Co. of America, Cleveland.

6:30 p.m.—Educational Dinner
(Sponsored by Educational Division)

Presiding—A. W. Gregg, Whiting Corp., Harvey, Ill. Co-chairman—D. F. Lane, Bethlehem Steel Co., Sparrows Point, Md.

Subject—*Management's View of Foundry Educational Activities.* Discussion leader—M. J. Gregory, Peoria, Ill.

8 p.m. (A)—Gray Iron Shop Course Session
(Sponored by Gray Iron Shop Course Committee)

Presiding—E. J. Burke, Hanna Furnace Co., Buffalo. Co-chairman—Arnold N. Kraft, Wilkening Mfg. Co., Philadelphia.

Subject—*Front Slagging of the Cupola.* Discussion leader—T. W. Curry, Lynchburg Foundry Co., Lynchburg, Va.

8 p.m. (B)—Sand Shop Course Session
(Sponsored by Sand Shop Course Committee)

Presiding—R. F. Thomson, International Nickel Co., Detroit. Co-chairman—C. A. Sanders, American Colloid Co., Chicago.

Subject—*Nonferrous Foundry Sands.* Discussion leader—J. Joseph Shannon, Jenkins Bros., Bridgeport, Conn.

Tuesday, May 4

10 a.m. (A)—Aluminum and Magnesium Session
(Sponsored by Aluminum and Magnesium Division)

Presiding—H. Brown, Solar Aircraft Co., Des Moines, Iowa. Co-chairman—H. R. Youngkrantz, Apex Smelting Co., Chicago.

Aluminum-Zinc-Magnesium-Copper Casting Alloys—L. W. Eastwood, Battelle Memorial Institute, Columbus, O., and L. W. Kempf, deceased, formerly with Aluminum Co. of America, Cleveland.

Effect of Titanium on Grain Size and Tensile Properties of an Aluminum 4.5% Cu (No. 195) Casting Alloy—W. E. Sicha and R. C. Boehm, Aluminum Co. of America, Cleveland.

A Fluidity Test for Aluminum Casting Alloys—W. E. Sicha and R. C. Boehm, Aluminum Co. of America, Cleveland.

10 a.m. (B)—Brass and Bronze Session
(Sponsored by Brass and Bronze Division)

Presiding — R. M. Brick, University of Pennsylvania, Philadelphia. Co-chairman—C. A. Robeck, Gibson & Kirk Co., Baltimore.

2 p.m. (B)—Malleable Session
(Sponsored by Malleable Division)

Presiding—C. F. Joseph, Central Foundry Division, General Motors Corp., Saginaw, Mich. Co-chairman—Eric Welander, Union Malleable Iron Works, Deere & Co., East Moline, Ill.

Application of Correlation in the Malleable Iron Foundry—R. G. Seidel, National Malleable & Steel Castings Co., Cleveland.

Production Hardness Testing in a Malleable Shop — C. Schneider and L. Ulsenheimer, National Malleable & Steel Castings Co., Cleveland.

TECHNICAL PROGRAM

The Technology of Copper-Lead Alloys—R. W. K. Honeycombe, Melbourne, Australia, *Institute of Australian Foundrymen Exchange Paper,* presented by William Ball Jr., Magnus Brass Division, National Lead Co., Cincinnati.

The Effect of Foundry Practice on the Properties of Some Binary Copper-Silicon Alloys—A. I. Krynitsky, W. F. Saunders and H. Stern, National Bureau of Standards, Washington.

10 a.m. (C)—Malleable Session
(Sponsored by Malleable Division)

Presiding—G. A. Vennerholm, Ford Motor Co., Dearborn, Mich. Co-chairman—W. B. McFerrin, Electro Metallurgical Co., Detroit.

Effect of Manganese Sulphur Ratio on the Rate of Anneal of Blackheart Malleable Iron—J. E. Rehder, Bureau of Mines, Ottawa, Canada.

Pearlitic Malleable Irons, Plain and Alloyed—D. J. Reese, International Nickel Co., New York, and Richard Schneidewind, University of Michigan, Ann Arbor, Mich.

12 Noon (A)—Aluminum and Magnesium Round-table Luncheon
(Sponsored by Aluminum and Magnesium Division)

Presiding—W. J. Klayer, Aluminum Industries Inc., Cincinnati. Co-chairman—M. E. Gantz, American Magnesium Co., Cleveland.

The Development of a Permanent Mold for Aluminum Tensile Test Bars—L. J. Ebert, R. E. Spear, and G. Sachs, Case Institute of Technology, Cleveland.

Discussion on *Permanent Mold Casting of Aluminum and Magnesium Alloys.*

12 Noon (B)—Malleable Round Table Luncheon
(Sponsored by Malleable Division)

Presiding—J. H. Lansing, Malleable Founders' Society, Cleveland. Co-chairman—A. M. Fulton, Northern Malleable Iron Co., St. Paul, Minn.

Subject—*Malleable Foundry Mechanization.* Discussion Leader—R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis.

2 p.m. (A)—Brass and Bronze Session
(Sponsored by Brass and Bronze Division)

Presiding—R. W. Parsons, Ohio Brass Co., Mansfield, O. Co-chairman—A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee.

A New Permeable Metal Casting Plaster—K. A. Miericke and E. S. Johnson, U. S. Gypsum Co., Chicago.

The Value of Pressure Tests and Radiographs of Gun Metal Castings—W. H. Baer, Naval Research Laboratory, Washington.

2 p.m. (B)—Heat Transfer Session
(Sponsored by Heat Transfer Committee)

Presiding—E. C. Troy, National Engineering Co., Philadelphia. Co-chairman—H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.

Heat Transfer Committee Report—H. A. Schwartz, National Malleable and Steel Castings Co., Cleveland.

Thermal Conductivity of a Sand Mixture—C. F. Lucks, O. L. Linebrink, and K. L. Johnson, Battelle Memorial Institute, Columbus.

Studies of Solidification of Aluminum Castings.

Studies of Solidification of White Iron Castings.

A Study of Solidification of Steel Spheres—V. Paschkis, Columbia University, New York.

2 p.m. (C)—Pattern Session
(Sponsored by Pattern Division)

Presiding—A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee. Co-chairman—L. F. Tucker, City Pattern & Foundry Co., South Bend, Ind.

Corebox Design and Rigging for Core Blowing—H. J. Jacobson, Industrial Pattern Works, Chicago.

Metallizing Wood Patterns—H. A. Erbe, General Steel Casting Co., Granite City, Ill.

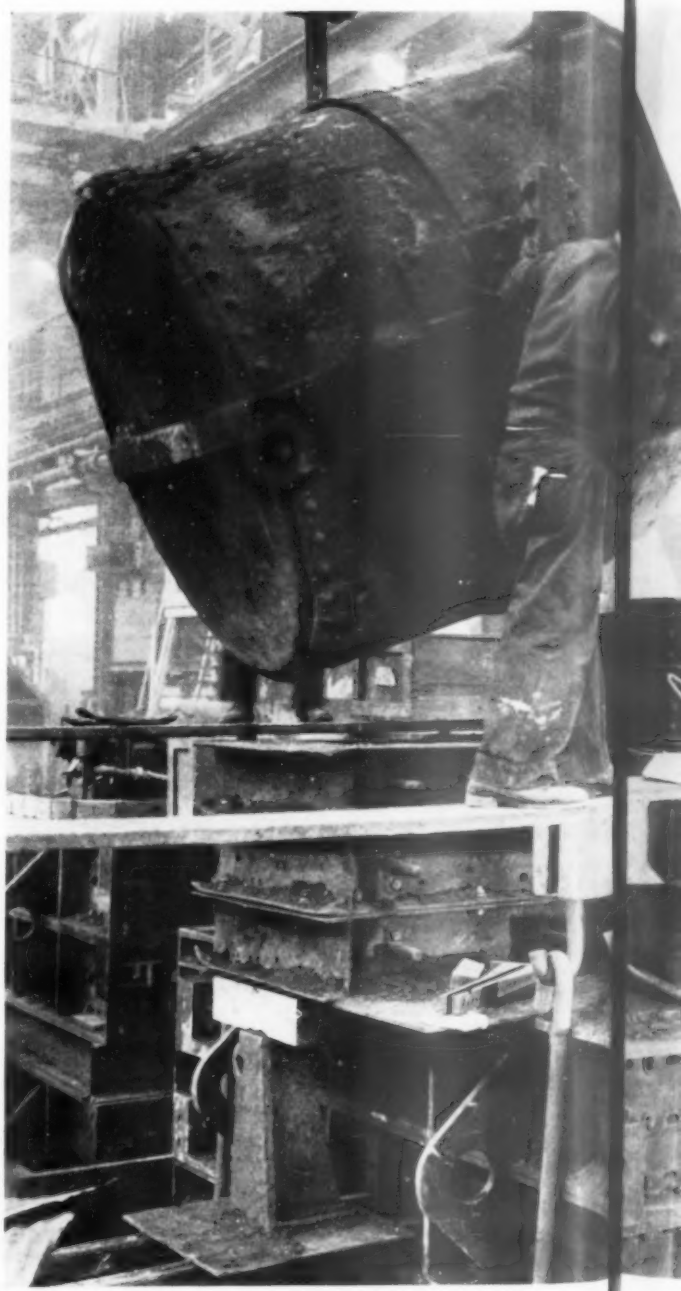
4 p.m. (A)—Lecture Course
(Sponsored by Annual Lecture Committee)

Presiding—C. A. Robeck, Gibson & Kirk Co., Baltimore. Co-chairman—W. W. Edens, Badger Brass & Aluminum Foundry Co., Milwaukee.

Subject—*Test Procedures for Quality Control of Sand Castings, Brass, Bronze & Nickel Alloys.* Discussion leader—William Romanoff, H. Kramer & Co., Chicago.

4 p.m. (B)—Lecture Course
(Sponsored by Annual Lecture Committee)

Presiding—H. N. Whitemore, National Malleable & Steel



Castings Co., Cleveland. Co-chairman—Milton Tilley, National Malleable & Steel Castings Co., Cleveland.

Subject—*Test Procedures for Quality Control of Malleable Iron Castings.* Discussion leader—M. O. Booth, Central Foundry Division, General Motors Corp., Saginaw, Mich.

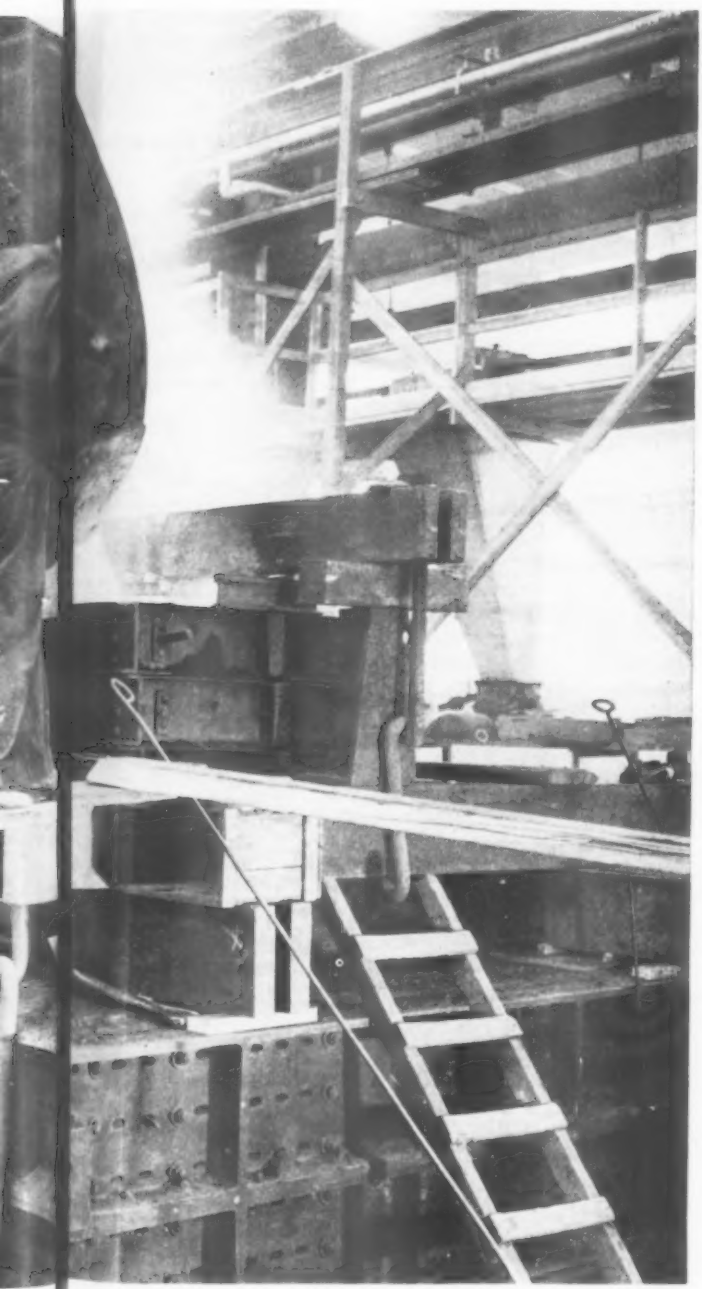
7 p.m.—Chapter Officers and Directors Dinner

Presiding—W. B. Wallis, vice president, American Foundrymen's Association.

8 p.m. (A)—Plant and Plant Equipment Session
(Sponsored by Plant and Plant Equipment Committee)

Presiding—James Thomson, Continental Foundry & Machine Co., East Chicago, Ind. Co-chairman—E. W. Beach, Campbell Wyant & Cannon Foundry Co., Muskegon, Mich.

Modernization of the Small Foundry—L. B. Knight, L. B. Knight & Associates Inc., Chicago.



Pouring a manganese-bronze propeller at the Philadelphia Naval Shipyard foundry

8 p.m. (B)—Gray Iron Shop Course Session
(Sponsored by Gray Iron Shop Course Committee)

Presiding—H. H. Wilder, Eaton Mfg. Co., Vassar, Mich. Co-chairman—B. A. Miller, Baldwin Locomotive Works, Eddystone, Pa.

Subject—*Effect of Blast Variation on Cupola Control.* Discussion leader—B. P. Mulcahy, Consultant, Indianapolis.

8 p.m. (C)—Sand Shop Course Session
(Sponsored by Sand Shop Course Committee)

Presiding—D. F. Sawtelle, Malleable Iron Fittings Co., Branford, Conn. Co-chairman—F. S. Brewster, Harry W. Dietert Co., Detroit.

Subject—*Malleable Foundry Sands.* Discussion leader—Robert P. Schauss, Illinois Clay Products Co., Chicago.

Wednesday, May 5

9:30 a.m.—Annual Business Meeting and Charles Edgar Hoyt Annual Lecture

Presiding—Max Kuniansky, president, American Foundrymen's Association.

President's Annual Address

Apprentice Contest Awards

Election of Officers and Directors

Charles Edgar Hoyt Annual Lecture—*The Control of Grain Size in Magnesium Castings*—C. E. Nelson, Dow Chemical Co., Midland, Mich.

12 Noon (A)—Engineering School Graduates Luncheon
(Sponsored by Educational Division)

Presiding—H. H. Judson, Minneapolis-Moline Power Implement Co., Minneapolis. Co-chairman—C. V. Nass, Pettibone-Mulliken Corp., Chicago.

Engineering Education—R. M. Brick, University of Pennsylvania, Philadelphia.

12 Noon (B)—Pattern Round-table Luncheon
(Sponsored by Pattern Division)

Presiding—L. F. Tucker, City Pattern & Foundry Co., Inc., South Bend, Ind. Co-chairman—H. K. Swanson, Swanson Pattern & Model Works, East Chicago, Ind.

Subject—*Patternmaking.* Discussion leader—Martin Rintz, Continental Foundry & Machine Co., East Chicago, Ind.

2 p.m. (A)—Gray Iron Session
(Sponsored by Gray Iron Division)

Presiding—V. A. Crosby, Climax Molybdenum Co., Detroit. Co-chairman—D. E. Krause, Gray Iron Research Institute, Columbus, O.

Relation of Cupola Research to Progress in Cast Iron Development—R. G. McElwee, Vanadium Corp. of America, Detroit.

A Suggested Method for the Determination of Coke Reactivity to Carbon Dioxide at Combustion Temperatures—H. E. Flanders, University of Utah, Salt Lake City.

2 p.m. (B)—Refractories Session
(Sponsored by Refractories Committee)

Presiding—R. H. Stone, Vesuvius Crucible Co., Pittsburgh. Co-chairman—A. S. Klopf, Western Foundry Co., Chicago.

Testing Refractories for the Foundry—S. M. Swain, North American Refractories Co., Cleveland.

Refractories Used in Steel and Iron Foundries—W. H. Owen, Harbison-Walker Refractories Co., Pittsburgh.

4 p.m. (A)—Lecture Course Session
(Sponsored by Annual Lecture Committee)

Presiding—G. A. Vennerholm, Ford Motor Co., Dearborn, Mich. Co-chairman—F. J. Dost, Sterling Foundry Co., Wellington, O.

TECHNICAL PROGRAM

Subject—*Test Procedures for Quality Control of Gray Iron Castings.* Discussion leader—F. J. Walls, International Nickel Co., Detroit.

4 p.m. (B)—Sand Session
(Sponsored by Sand Division)

Presiding—E. C. Troy, National Engineering Co., Philadelphia. Co-chairman—C. W. Briggs, Steel Founders' Society of America, Cleveland.

Surface Gas Pressure of Molding Sands and Core Sands—H. W. Dietert, H. H. Fairfield, and F. S. Brewster, Harry W. Dietert Co., Detroit.

Changes in Chemistry of Liquid Steel in Contact with Sand—Report of Mold Surface Committee, J. B. Caine, Sawbrook Steel Castings Co., Lockland, Cincinnati.

Sieve and Grade Scales—R. E. Morey, Naval Research Laboratory, Washington.

7 p.m.—Canadian Dinner

Presiding—E. N. Delahunt, Warden King Ltd., Montreal.

8 p.m. (A)—Refractories Session
(Sponsored by Refractories Committee)

Presiding—A. S. Klopf, Western Foundry Co., Chicago. Co-chairman—C. F. Joseph, Central Foundry Division, General Motors Corp., Saginaw, Mich.

Information Please—Question and Answer Panel.

8 p.m. (B)—Gray Iron Shop Course Session
(Sponsored by Gray Iron Shop Course Committee)

Presiding—W. W. Levi, Lynchburg Foundry Co., Radford, Va. Co-chairman—C. L. Lane, Florence Pipe & Machine Co., Florence, N. J.

Subject—*Cupola Coke.* Discussion leader—J. A. Bowers, American Cast Iron Pipe Co., Birmingham, Ala.

8 p.m. (C)—Sand Shop Course Session
(Sponsored by Sand Shop Course Committee)

Presiding—E. L. Thomas, Cadillac Motor Car Co., Detroit. Co-chairman—N. J. Dunbeck, Eastern Clay Products Inc., Jackson, O.

Subject—*Gray Iron Foundry Sands.* Discussion leader—T. W. Curry, Lynchburg Foundry Co., Lynchburg, Va.

Thursday, May 6

10 a.m. (A)—Gray Iron Session
(Sponsored by Gray Iron Division)

Presiding—A. E. Schuh, U. S. Pipe & Foundry Co., Burlington, N. J. Co-chairman—F. G. Sefing, International Nickel Co., New York.

A Laboratory Evaluation of Some Automotive Cast Irons—A. B. Shuck, Koppers Co., Inc., American Hammered Piston Ring Division, Baltimore.

Contraction and Distortion in Ferrous Castings—E. Longden, P. R. Jackson & Co. Ltd., Manchester, England—*Institute of British Foundrymen Exchange Paper.*

10 a.m. (B)—Job Evaluation and Time Study Session
(Sponsored by Job Evaluation and Time Study Committee).

Presiding—R. J. Fisher, Falk Corp., Milwaukee. Co-chairman—M. E. Annich, American Brake Shoe Co., Mahwah, N. J.

Grinding Standards Help to Eliminate Cleaning Room Bottlenecks—Dean Van Order, Burnside Steel Foundry Co., Chicago.

10 a.m. (C)—Steel Session
(Sponsored by Steel Division)

Presiding—W. W. Moore, Burnside Steel Foundry Co., Chicago. Co-chairman—H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.

Observation on Knock-Off Risers as Applied to Steel Castings—J. A. Duma and S. W. Brinson, Norfolk Naval Shipyard, Portsmouth, Va.

A Theoretical Approach to the Problem of Dimensioning Risers—J. B. Caine, Sawbrook Steel Castings Co., Lockland, Cincinnati.

12 Noon—Steel Round-table Luncheon
(Sponsored by Steel Division)

Presiding—J. A. Duma, Portsmouth Foundry & Engineering Corp., Portsmouth, Va. Co-chairman—J. A. Rassenfoss, American Steel Foundries, East Chicago, Ind.

Motion Picture on *Gating Systems for Metal Casting*—W. H. Johnson and W. O. Baker, Naval Research Laboratory, Washington. Followed by discussion.

2 p.m. (A)—Foundry Cost Session
(Sponsored by Cost Committee)

Presiding—R. L. Lee, Grede Foundries Inc., Milwaukee. Co-chairman—C. E. Westover, Westover Engineers, Milwaukee.

Question and Answer Panel—Cost Problems of General Interest, Method of Cost Accounting, Distribution of Costs, etc.

2 p.m. (B)—Gray Iron Session (Symposium on Heat Treatment)
(Sponsored by Gray Iron Division)

Presiding—J. S. Vanick, International Nickel Co., New York. Co-chairman—T. E. Eagan, Cooper-Bessemer Corp., Grove City, Pa.

Comments on Symposium—G. A. Timmons, Climax Molybdenum Co., Detroit.

Fundamentals of Heat Treating Gray Cast Iron—A. Boyles, U. S. Pipe & Foundry Co., Burlington, N. J.

Gray Iron Hardenability and Its Relation to Air Quenching of Castings—R. A. Flinn and R. J. Ely, American Brake Shoe Co., Mahwah, N. J.

4 p.m. (A)—Lecture Course Session
(Sponsored by Annual Lecture Committee)

Presiding—G. A. Lillieqvist, American Steel Foundries, East Chicago, Ind. Co-chairman—C. H. Lorig, Battelle Memorial Institute, Columbus, O.

Subject—*Test Procedures for Quality Control of Steel Castings.* Discussion leader—J. W. Juppenlatz, Lebanon Steel Foundry, Lebanon, Pa.

4 p.m. (B)—Gray Iron Session (Symposium on Heat Treatment)
(Sponsored by Gray Iron Division)

Presiding—H. Bornstein, Deere & Co., Moline, Ill. Co-chairman—D. A. Paull, Sealed Power Corp., Muskegon, Mich.

Stress Relief of Gray Iron Castings—J. H. Schaum, National Bureau of Standards, Washington.

Conventional vs. Salt Bath Hardening of Cast Iron Cylinder Liners—G. Lahr, Detroit, Engine Division, General Motors Corp., Detroit.

4 p.m. (C)—Sand Session
(Sponsored by Sand Division)

Presiding—J. A. Rassenfoss, American Steel Foundries, East Chicago, Ind. Co-chairman—E. C. Zirzow, National Malleable & Steel Castings Co., Cleveland.

Progress Report on High Temperature Properties of Steel Molding Sands—P. E. Kyle, Cornell University, Ithaca, N. Y.

Strainer Cores—H. L. Campbell, Western Foundry Co., Chicago.

Causes of Rat-Tail Casting Defects—Report of AFA Committee on Physical Properties of Iron Foundry Molding Materials at Elevated Temperatures,—H. W. Dietert, Harry W. Dietert Co., Detroit.

4 p.m. (D)—Job Evaluation and Time Study Session
(Sponsored by Job Evaluation and Time Study Committee)

Presiding—R. J. Fisher, Falk Corp., Milwaukee. Co-chairman—M. E. Annich, American Brake Shoe Co., Mahwah, N. J.

Question and Answer Panel.

8 p.m. (A)—Gray Iron Shop Course Session
(Sponsored by Gray Iron Shop Course Committee)

Presiding—K. H. Priestley, Vassar Electroloy Products Inc., Vassar, Mich. Co-chairman—Ralph Koch, U. S. Pipe & Foundry Co., Burlington, N. J.

Subject—*Factors Affecting Fluidity of Cupola Iron.* Discussion leader—R. F. Flora, Clover Foundry Co., Muskegon, Mich.

8 p.m. (B)—Sand Shop Course Session
(Sponsored by Sand Shop Course Committee)

Presiding—R. H. Jacoby, Key Co., East St. Louis, Ill. Co-chairman—E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit.

Subject—*Steel Foundry Sands.* Discussion leader—Charles Locke, Armour Research Foundation, Chicago.

Friday, May 7

10 a.m. (A)—Gray Iron Session
(Sponsored by Gray Iron Division)

Presiding—J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala. Co-chairman—W. W. Levi, Lynchburg Foundry Co., Radford, Va.

Improvement of Machinability in High Phosphorus Gray Cast Irons—W. W. Austin, Jr., Southern Research Institute, Birmingham.

The Production of Nodular Graphite Structure in Gray Cast Iron—H. Morrogh, British Cast Iron Research Association, Alvechurch, Birmingham, England.

10 a.m. (B)—Steel Session
(Sponsored by Steel Division)

Presiding—Frank Kiper, Ohio Steel Foundry, Springfield, O. Co-chairman—V. E. Zang, Unitcast Corp., Toledo, O.

Tensile Properties vs. Composition of Double Normalized Cast Steel—W. K. Bock and H. A. Schwartz, National Malleable & Steel Casting Co., Cleveland.

The Delayed Quench for Steel Castings—S. L. Gertsman, Bureau of Mines, Ottawa, Canada.

Electro-Chemical Cleaning of a Large Steel Casting—An Experiment—J. A. Wettergreen, General Electric Co., Schenectady, N. Y.

2 p.m. (A)—Gray Iron Session
(Sponsored by Gray Iron Division)

Presiding—R. G. McElwee, Vanadium Corp. of America, Detroit. Co-chairman—E. C. Jeter, Ford Motor Co., Dearborn, Mich.

Oxygen Enriched Cupola Blast—W. C. Wick, Armour Research Foundation, Chicago.

Solidification Characteristics of Gray Iron—J. H. Schaum, National Bureau of Standards, Washington, and J. E. Fifield, International Nickel Co., Hartford, Conn.

2 p.m. (B)—Steel Session
(Sponsored by Steel Division)

Presiding—J. F. Randall, Ford Motor Co., Detroit. Co-chairman—D. C. Zuege, Sivyer Steel Casting Co., Milwaukee.

Statistical Quality Control—A New Tool for the Foundryman—H. H. Johnson and G. A. Fisher, National Malleable & Steel Castings Co., Sharon, Pa.

Development of Techniques for Quality Welding of Steel Castings—J. D. Wozny and E. L. LaGrelius, American Steel Foundries, East Chicago, Ind.

7 p.m.—Annual Banquet

Presiding—Max Kuniansky, president, AFA.

Presentation of AFA Gold Medal Awards and Honorary Life Membership.

Speaker—Dr. Karl Taylor Compton, president, Massachusetts Institute of Technology, Cambridge, Mass. Subject—*Team Play of Hand and Brain.*

TIME TABLE OF TECHNICAL SESSIONS	MONDAY AM	MONDAY PM	TUESDAY AM	TUESDAY PM	WEDNESDAY AM	WEDNESDAY PM	THURSDAY AM	THURSDAY PM	FRIDAY AM	FRIDAY PM
ALUMINUM & MAGNESIUM	X	X	X	⊗						
BRASS & BRONZE		⊗ X	X	X						
COSTS								X		
EDUCATIONAL	X	X								
GRAY IRON						X	X	X X	X	X
HEAT TRANSFER				X						
JOB EVALUATION & TIME STUDY							X	X		
LECTURE COURSE		X		X X		X		X		
MALLEABLE	X	X	X	⊗						
PATTERNS				X		⊗				
PLANT EQUIPMENT				X						
REFRACTORIES						X X				
SAND						X		X		
STEEL							X	⊗	X	X
SHOP COURSE (GRAY IRON)		X		X		X		X		
SHOP COURSE (SAND)		X		X		X		X		

(ANNUAL BUSINESS MEETING)

X MEETINGS ⊗ ROUND-TABLE LUNCHEON

Philadelphia

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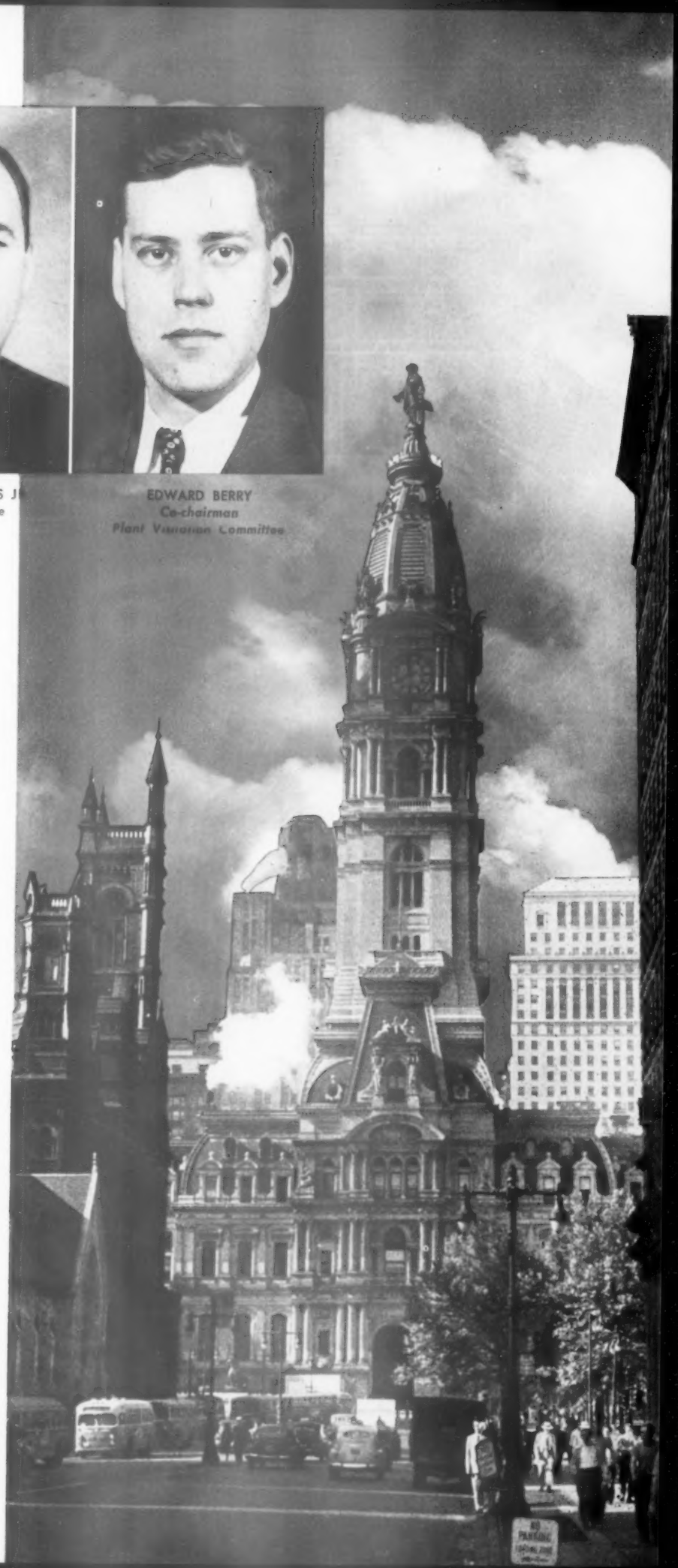
THOMAS J. GERWIG
General Committee



FOUNDRY

To Emphasize New

WITH more than 260 suppliers of foundry equipment, materials and services participating in the Foundry Show to be held in Philadelphia during AFA convention week, May 3 through 7, one of the most interesting and valuable foundry exhibitions in history is in prospect. Exhibits will be in Convention and Exhibition halls near 34th street, a short distance from downtown Philadelphia.

Added interest in the show has been created by the fact more new equipment is scheduled to be displayed this year than at any other annual meeting of AFA since 1930. Many new and improved products were not completed immediately after the war in time for display at the 1946 show in Cleveland, and this helps to account for the large number of latest developments which will have their initial showing at Philadelphia.

The list of exhibitors includes many which have never participated in an AFA show, as well as a number which have not taken part for many years.

Exhibit hours will be as follows: Monday and Thursday, 9 a.m. to 5:30 p.m.; Tuesday, 9 a.m. to 9 p.m.; Wednesday, the day of the annual business meeting, 11 a.m. to 5:30 p.m.; Friday, 9 a.m. to 4:30 p.m.

Tuesday has been designated "Philadelphia Day" and will be observed with special activities arranged by Philadelphia Chapter acting as host. Local plant men will be admitted to the exhibit halls that day from 2 to 9 p.m. by special tickets distributed by the chapters.

SHOW

Developments

List of Exhibitors

(Corrected to April 12)

Accurate Match Plate Co., Chicago
Adams Co., Dubuque, Iowa
Air Reduction Sales Co., New York
Ajax Electrothermic Corp., Trenton, N. J.
Ajax Engineering Co., Trenton, N. J.
Ajax Metal Co., Philadelphia
Ajax Flexible Coupling Co., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee
Alloy Metal Abrasive Co., Ann Arbor, Mich.
Alpha-Lux Co., New York
Aluminum Refiners Division, Bohn Aluminum & Brass Corp., Detroit
American Air Filter Co., Louisville
American Crucible Co., North Haven, Conn.
American Gas Association, New York
American Metal Market, New York
American Optical Co., Southbridge, Mass.
American Steel Abrasives Co., Galion, O.
American Wheelabrator & Equipment Corp., Mishawaka, Ind.
Arcade Mfg. Division (Rockwell Mfg. Co.) Freeport, Ill.
Arcos Corp., Philadelphia
Asbury Graphite Mills Inc., Asbury, N. J.
Ayers Mineral Co., Zaneseville, O.

Baroid Sales Division, National Lead Co., Chicago
C. O. Bartlett & Snow Co., Cleveland
Bay State Crucible Co., Taunton, Mass.
Beardsley & Piper Co., Chicago
Bell Aircraft Corp., Buffalo
Blaw-Knox Division of Blaw-Knox Co., Pittsburgh
Bloomsbury Graphite Co., Bloomsbury, N. J.
Bradley Washfountain Co., Milwaukee
Buckeye Tools Corp., Dayton, O.
Bullard Gage Co., Detroit
Butler Bin Co., Waukesha, Wis.

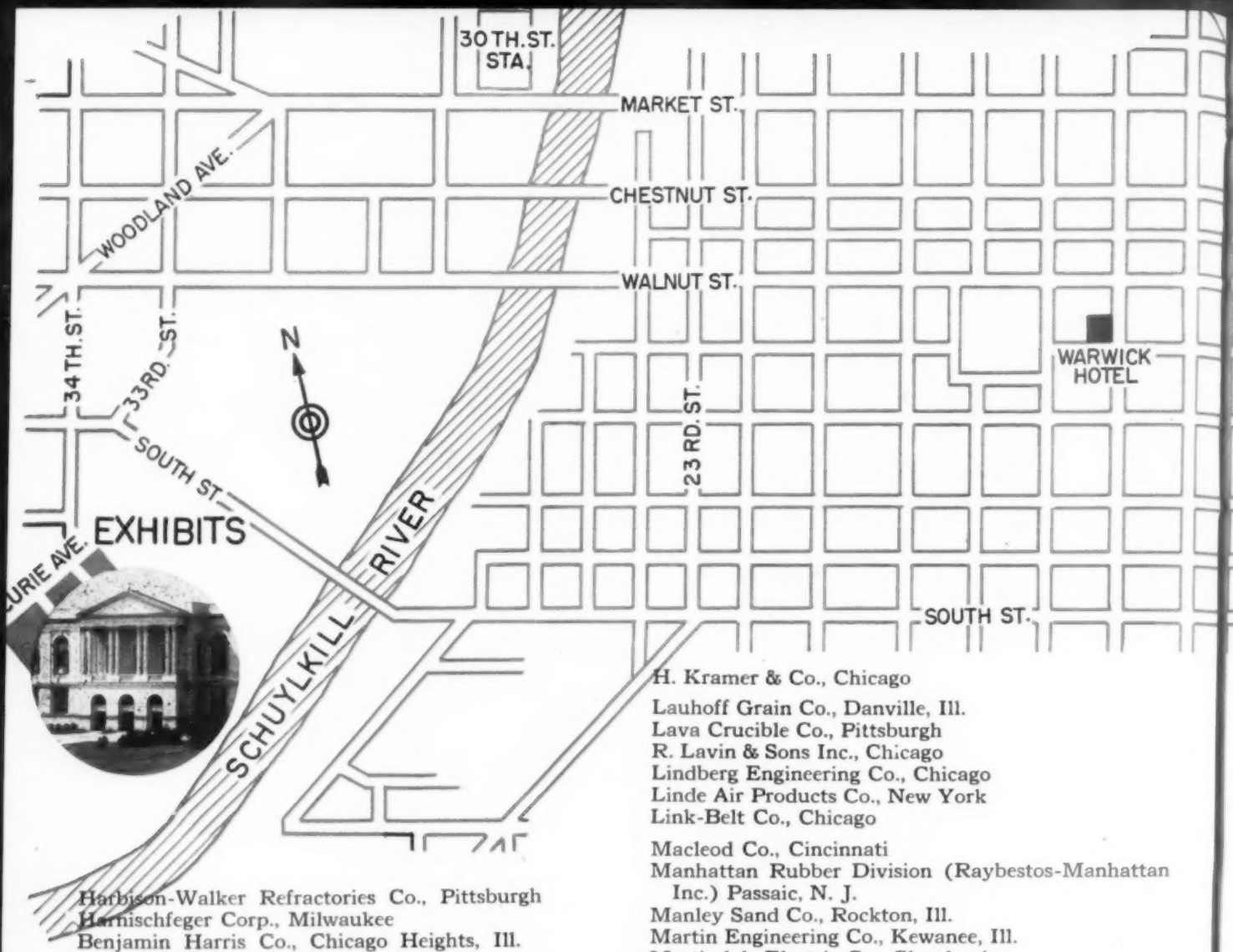
Campbell-Hausfeld Co., Harrison, O.
Capewell Mfg. Co., Hartford, Conn.
Carlson Pattern Shop Inc., Springfield, Mass.
Casein Co. of America, New York
Central Silica Co., Zanesville, O.
Centrifugal Casting Machine Co., Tulsa, Okla.
Certified Core Oil Division (Socony-Vacuum Oil Co.) Cicero, Ill.
Chain Belt Co., Milwaukee
Champion Foundry & Machine Co., Chicago
Chicago Pneumatic Tool Co., New York
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
Christiansen Corp., Chicago
Clearfield Machine Co., Clearfield, Pa.
Cleco Division, Reed Roller Bit Co., Houston, Tex.
Clersite Co., Chicago
Cleveland Flux Co., Cleveland
Cleveland Metal Abrasive Co., Cleveland
Cleveland Vibrator Co., Cleveland
Climax Molybdenum Co., New York
Colonial Smelting & Refining Co., Columbia, Pa.
Columbus McKinnon Chain Corp., Tonawanda, N. Y.
Combined Supply & Equipment Co., Buffalo
Corn Products Sales Co., New York
G. & W. H. Corson Inc., Philadelphia
Crescent Machine Division (Rockwell Mfg. Co.,) Leetonia, O.

Dallett Co., Philadelphia
Davenport Machine & Foundry Co., Davenport, Iowa
Davey Compressor Co., Kent, O.
Dayton Oil Co., Dayton, O.
Dayton Pneumatic Tool Co., Dayton, O.
Debevoise-Anderson Co., New York
Delhi Foundry Sand Co., Cleveland
Delta Mfg. Division (Rockwell Mfg. Co.) Milwaukee
Delta Oil Products Co., Milwaukee
William Demmler & Bros., Kewanee, Ill.
Despatch Oven Co., Minneapolis
Detroit Electric Furnace Division (Kuhlman Electric Co.) Bay City, Mich.
Diamond Clamp & Flask Co., Richmond, Ind.
Harry W. Dietert Co., Detroit
Dings Magnetic Separator Co., Milwaukee
Joseph Dixon Crucible Co., Jersey City, N. J.
DoAll Co., Des Plaines, Ill.
Dougherty Lumber Co., Cleveland
M. Dobbins Vocational-Technical School, Philadelphia
Duquesne Smelting Corp. (American Metal Co. Ltd.) Pittsburgh

Eastern Clay Products Inc., Jackson, O.
Eastman Kodak Co., Rochester, N. Y.
Electro Metallurgical Co., New York
Electro Refractories & Alloys Corp., Buffalo
Exomet Inc., Conneaut, O.
Exothermic Alloy Sales & Service Inc., Chicago

Fabreeka Products Co., Boston
Federal Foundry Supply Co., Cleveland
Federated Metals Division (American Smelting & Refining Co.) New York
Fellows Corp., Milwaukee
THE FOUNDRY, Cleveland
Foundry Educational Foundation, Cleveland
Foundry Equipment Co., Cleveland
Foundry Equipment Manufacturers Association, Cleveland
Foxboro Co., Foxboro, Mass.
Fox Grinders Inc., Pittsburgh
Freeman Supply Co., Toledo, O.
Fremont Flask Co., Fremont, O.

General Cerium Sales Corp., Edgewater, N. J.
General Electric X-Ray Corp., Milwaukee
Globe Steel Abrasive Co., Mansfield, O.
Gray Iron Founders' Society, Cleveland
Great Lakes Foundry Sand Co., Detroit
Great Western Mfg. Co., Leavenworth, Kans.
Samuel Greenfield Co., Buffalo
Grob Brothers, Grafton, Wis.



Harbison-Walker Refractories Co., Pittsburgh
Harnischfeger Corp., Milwaukee
Benjamin Harris Co., Chicago Heights, Ill.
Harrison Abrasive Corp., Elizabeth, N. J.
Hercules Powder Co., Wilmington, Del.
Herman Pneumatic Machine Co., Pittsburgh
Hickman, Williams & Co.
Hill & Griffith Co., Cincinnati
Hines Flask Co., Cleveland
Frank G. Hough Co., Libertyville, Ill.
Hougland & Hardy—Hardy Sand Co., Evansville, Ind.
E. F. Houghton & Co., Philadelphia
Hydro-Blast Corp., Chicago
Hyster Co., Portland, Oreg.

Illinois Testing Laboratories Inc., Chicago
Independent Pneumatic Tool Co., Aurora, Ill.
Induction Heating Corp., Brooklyn, N. Y.
Industrial Fabricating Inc., Eaton Rapids, Mich.
Ingersoll-Rand Co., New York
International Graphite & Electrode Corp., St. Marys, Pa.
International Molding Machine Co., La Grange Park, Ill.
International Nickel Co., New York
Invincible Vacuum Cleaner Mfg. Co., Philadelphia
Iron Age, New York
Ironton Fire Brick Co., Ironton, O.

Jeffrey Mfg. Co., Columbus, O.
Johnson-March Corp., Philadelphia
Johnston & Jennings Co., Cleveland

Kindt-Collins Co., Cleveland
Andrew King, Construction Engineer, Narberth, Pa.
Lester B. Knight & Associates Inc., Chicago
H. Kramer & Co., Chicago

Lauhoff Grain Co., Danville, Ill.
Lava Crucible Co., Pittsburgh
R. Lavin & Sons Inc., Chicago
Lindberg Engineering Co., Chicago
Linde Air Products Co., New York
Link-Belt Co., Chicago

Macleod Co., Cincinnati
Manhattan Rubber Division (Raybestos-Manhattan Inc.) Passaic, N. J.
Manley Sand Co., Rockton, Ill.
Martin Engineering Co., Kewanee, Ill.
Martindale Electric Co., Cleveland
Master Pneumatic Tool Co., Orwell, O.
Material Movement Industries Inc., Skokie, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
J. S. McCormick Co., Pittsburgh
Meehanite Metal Co., New Rochelle, N. Y.
Metallizing Co. of America, Chicago
Metlab Co., Philadelphia
Michigan Smelting & Refining Division, Bohn Aluminum & Brass Corp., Detroit
Milwaukee Foundry Equipment Co., Milwaukee
Millwood Sand Co., Zaneseville, O.
Mine Safety Appliances Co., Pittsburgh
Modern Equipment Co., Port Washington, Wis.
Moulders' Friend, Dallas City, Ill.

Nassau Smelting & Refining Co., Tottenville, N. Y.
National Carbon Co., New York
National Crucible Co., Philadelphia
National Engineering Co., Chicago
National Founders Association
National Foundry Sand Co., Detroit
National Pigment Co., Philadelphia
National Pulverizing Co., Millville, N. J.
National Safety Council
Newaygo Engineering Co., Newaygo, Mich.
New Jersey Silica Sand Co., Millville, N. J.
Niagara Falls Smelting & Refining Division (Continental-United Industries Co.), Buffalo
William H. Nicholls Co., Richmond Hill, N. Y.
Nichols Engineering & Research Corp., New York
Non-Ferrous Founders' Society, Chicago
North American Smelting Co., Philadelphia

S. Obermayer Co., Chicago
Oliver Machinery Co., Grand Rapids, Mich.
Osborn Mfg. Co., Cleveland

P M S Co., Cleveland
Palmer Bee Co., Detroit
Pangborn Corp., Hagerstown, Md.
Ottes E. Paris, Chicago
Peninsular Grinding Wheel Co., Detroit
Penn-Rillton Co., New York
Pennsylvania Foundry Supply & Sand Co., Philadelphia
Penola Inc., Chicago
Penton Publishing Co., Cleveland
George F. Pettinos Inc., Philadelphia
George Pfaff Inc., Long Island City, N. Y.
Pittsburgh Crushed Steel Co., Pittsburgh
Pittsburgh Lectromelt Furnace Corp., Pittsburgh
Pittsburgh Metals Purifying Corp., Pittsburgh
Plastic Corp. of Chicago, Cicero, Ill.
Powermatic Ventilator Co., Cleveland
Pratt & Whitney Division, Niles Bement Pond, Hartford, Conn.
Precision Grinding Wheel Co., Philadelphia
Pressure Match Plate Co., Philadelphia
Pulmosan Safety Equipment Corp., Brooklyn, N. Y.
Pyro Refractories Co., Oak Hill, O.
Pyrometer Instrument Co., New York

Quigley Co., New York
Radium Chemical Co., New York
Ramtite Co. (S. Obermayer Co.) Chicago
Randall Foundry Equipment Corp., Cleveland
N. Ransohoff Inc., Cincinnati
Ready-Power Co., Detroit
Redford Iron & Equipment Co., Detroit
W. G. Reichert Engineering Co., Newark, N. J.
Reliable Castings Corp., Cincinnati
Republic Coal & Coke Co., Chicago
H. H. Robertson Co., Pittsburgh
Robins Conveyors Division, Hewitt-Robins Inc., Passaic, N. J.
Roots-Connersville Blower Corp., Connersville, Ind.
Ross-Tacony Crucible Co., Philadelphia
Rotor Tool Co., Cleveland
Royer Foundry & Machine Co., Kingston, Pa.

Safety Clothing & Equipment Co., Cleveland
Claude B. Schneible Co., Detroit
A. Schrader's Son Division, Scovill Mfg. Co., Brooklyn, N. Y.
Schramm Inc., West Chester, Pa.
Scientific Cast Products Corp., Cleveland
Semet-Solvay Division (Allied Chemical & Dye) New York
Severance Tool Industries Inc., Saginaw, Mich.
Simonds Abrasive Co., Philadelphia
Simplicity Engineering Co., Durand, Mich.
W. W. Sly Mfg. Co., Cleveland
Werner G. Smith Co., Cleveland
Smith Facing & Supply Co., Cleveland
Smith Oil & Refining Co., Rockford, Ill.
Southern Ferro Alloys Division, Chattanooga, Tenn.
Spencer Turbine Co., Hartford, Conn.
SPO Inc., Cleveland
Springfield Facing Co., Harrison, N. J.
Standard Conveyor Co., St. Paul
Standard Electrical Tool Co., Cincinnati
Standard Horse Nail Corp., New Brighton, Pa.
Standard Sand & Machine Co., Chicago
Steel Shot & Grit Co., Boston
Steel Shot Producers Inc., Butler, Pa.
Sterling Wheelbarrow Co., Milwaukee
Stoller Chemical Co., Akron, O.
Frederic B. Stevens Inc., Detroit
Stroman Furnace & Engineering Co., Franklin Pk., Ill.
Swan-Finch Oil Corp., New York
Syntron Co., Homer City, Pa.

Tabor Mfg. Co., Philadelphia
Taggart & Co., Philadelphia
Tamms Silica Co., Chicago
Tennessee Products & Chemical Corp., Nashville
Thiem Products Inc., Milwaukee
Tincher Products Co., Chicago

Union Carbide & Carbon Corp., New York
United Compound Co. Inc., Buffalo
United Oil Mfg. Co., Erie, Pa.
United States Graphite Co., Saginaw, Mich.
United States Rubber Co. (Mechanical Goods Division), New York
U. S. Hoffman Machinery Corp., New York
U. S. Navy Department
U. S. Reduction Co., East Chicago, Ind.

Vanadium Corp. of America, New York
Velsicol Corp., Chicago
Vesuvius Crucible Co., Pittsburgh

Jervis B. Webb Co., Detroit
Wellman Products Co., Cleveland
White Bros. Smelting Corp., Philadelphia
Whitehead Bros. Co., New York
Whiting Corp., Harvey, Ill.
Wilson Industries Inc., Boston

Yale & Towne Mfg. Co., Philadelphia
Young Bros. Co., Detroit

AFA Medalists for 1948

THREE outstanding foundrymen have been chosen by the American Foundrymen's Association's Board of Awards to receive gold medals during the Philadelphia convention, in recognition of their personal contributions to the advancement of the castings industry. The presentations will be made at the annual banquet Friday evening, May 7, together with the awarding of an honorary life membership in the association to Max Kuniansky, retiring president..

Egbert H. Ballard of Swampscott, Mass., will receive the William H. McFadden Gold Medal in recognition of his "steadfast and sincere efforts in behalf of the association while serving as its president during most difficult times, and his continual contributions to the foundry industry throughout his business career."

Richard G. McElwee, iron foundry division manager, Vanadium Corp. of America, Detroit, will be awarded the John A. Penton Gold Medal for "outstanding contributions to the dissemination of information to the foundry industry, especially for his splendid efforts on behalf of the Cupola Research Project."

Peter E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, O., will be the recipient of the Peter L. Simpson Gold Medal for his "outstanding work in promoting better housekeeping and safety practices in the foundry and for the inspiration he has given the foundry industry in the field of public relations."

Egbert H. Ballard was born in Hartford, Conn., and received his early education in Lynn, Mass., where his father was associated with Thomson-Houston Electric Co. He worked in various departments of the plant during summer vacations, and in 1894 became a clerk in the steel foundry. During the next 10 years he acquired a background in all phases of foundry operation. In 1905 he was appointed superintendent of the

To Honor Retiring President

MAX KUNIANSKY

MAX KUNIANSKY, retiring president of the AFA, will be honored during the convention by being awarded a life membership in the association. A former recipient of the McFadden gold medal of AFA, he has been associated since 1923 with the Lynchburg Foundry Co., Lynchburg, Va., where he is now vice president and general manager.

RICHARD G. McELWEE

EGBERT H. BALLARD

PETER E. RENTSCHLER

Massachusetts Steel Casting Co., Everett, Mass., which later was acquired by General Electric Co. During his association with General Electric Co. he was in charge of the steel and brass foundries and was appointed general superintendent of all foundries and pattern shops in 1925. He retired in 1943. Active in foundry groups, Mr. Ballard served as president of the New England Foundrymen's Association in 1922. With the American Foundrymen's Association he was a director from 1927 to 1930, vice president of the association in 1930-31 and president the following year.

Richard G. McElwee was born in Williamsport, Pa., and received his education in public schools there and in Galeton, Pa. He began his foundry career in 1915 as chief inspector, Muncie Foundry & Machine Co., Muncie, Ind. A year later he became associated with General Motors Truck Co., Pontiac, Mich., and in 1926 was appointed engineer of American Car & Foundry Co., Detroit. From 1928 to 1932 he was foundry engineer, Whitehead & Kales Co., River Rouge, Mich., and in the latter year was associated with Ecorse Foundry Co., Ecorse, Mich. He has been with Vanadium Corp. of America, Detroit, since 1936, where he is now iron foundry division manager. Mr. McElwee is a former chairman of the Detroit Chapter of the American Foundrymen's Association. He is the present chairman of the gray iron division of the AFA, and has been chairman of its Cupola Research Committee since 1943.

Peter E. Rentschler, a native of Hamilton, O., received his early education there, and was graduated from Princeton University. He became associated with Hamilton Foundry & Machine Co. in 1920, and was named a director that year. In 1923 he was appointed vice president and has been president since 1927. He also serves as secretary of the Decatur Casting Co., Hamilton, O., and Decatur, Ind. Mr. Rentschler has been active for many years in the Gray Iron Founders' Society and was its president in 1936-1938. He is the society's representative on the board of trustees of the Foundry Educational Foundation, of which he is also vice president. Mr. Rentschler has served with various civic and industrial groups, including the presidency of the Hamilton Board of Education and the Hamilton Safety Council and as vice president of the Hamilton Chamber of Commerce.

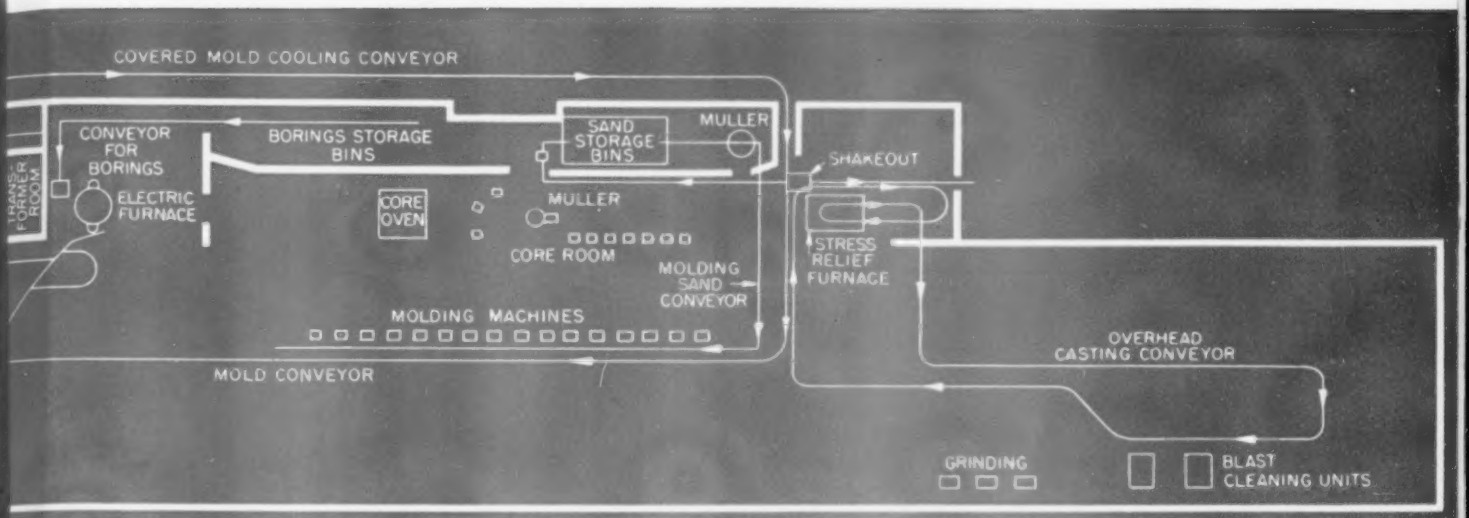
By EDWIN BREMER

Metallurgical Editor
THE FOUNDRY

Fig. 1 — Sketch showing arrangement of the various types of foundry equipment

Fig. 2 — Close-up view on the pouring line. Mold weights are designed to permit pouring into sprues located in different positions

Fig. 3 — General view of the pouring station in which may be seen the traveling platform, mold conveyor line, and the mold-weight shifting system which operates automatically



Modernized Foundry

Stresses Good Working Conditions

MOST striking impression on entering the new foundry of Fairbanks, Morse & Co., Freeport, Ill., is the cleanliness of atmosphere and surroundings. It is also interesting to note that this is not a new building replete with all the modern innovations, but an old foundry completely revamped to produce castings under the most satisfactory working conditions. Essentially these goals were accomplished by segregating dust, smoke and fume generating areas, and installing equipment to minimize worker fatigue.

Another unusual feature is that the only purchased raw metal material employed for castings production is cast iron borings. These are melted continuously in an electric arc furnace in sufficient quantity to produce 40 tons of castings a day. Castings have an average weight of 15 lb. About 8 tons of sprue and defective castings also are charged into the furnace; one half in the morning at the start of melting and one half in the afternoon. At present the total foundry force is 55 employees.

In the accompanying illustrations, Fig. 1 shows the general arrangement of the foundry, which is located in a building about 570 ft long. Central section of the building is 112 x 296 ft while the two end portions are 75 x 136 ft. Molding sand storage and cast iron boring storage bins are elevated and separated from the foundry by a wall, as indicated at the top of Fig. 1. Molding sand is stored in two bins holding 110 tons each, while borings are stored in bins holding 1000 tons with five separate automatic outlets underneath. Smaller bins for bentonite, wood flour and seacoal also are located in this section of the building above the muller used for preparing molding sand.

Borings arrive at the plant in open-top railroad cars and are unloaded by a clamshell bucket which discharges them on top of a coarse scalping screen (Fig. 15) for removal of pieces of wood and other undesirable material. Borings drop through the scalping screen to a vibrating screen of smaller mesh which breaks up any lumps, and then into the boot of a bucket elevator which carries them above the roof of the building. There the borings are discharged onto a shuttle conveyor which distributes them to the various storage bins. Likewise, bags of bentonite, wood flour, seacoal, etc., unloaded from freight cars are placed on an inclined, cleat-type conveyor (Fig. 14) and elevated to the second floor where they fall onto a conveyor belt which transports them to the hoppers over the muller, or to storage.

Molding sand is of the synthetic type. The original base is core sand of about 62 average grain fineness. Sufficient sand is added each day through disintegration of cores at the shakeout to replace that lost through adherence to the castings, etc.

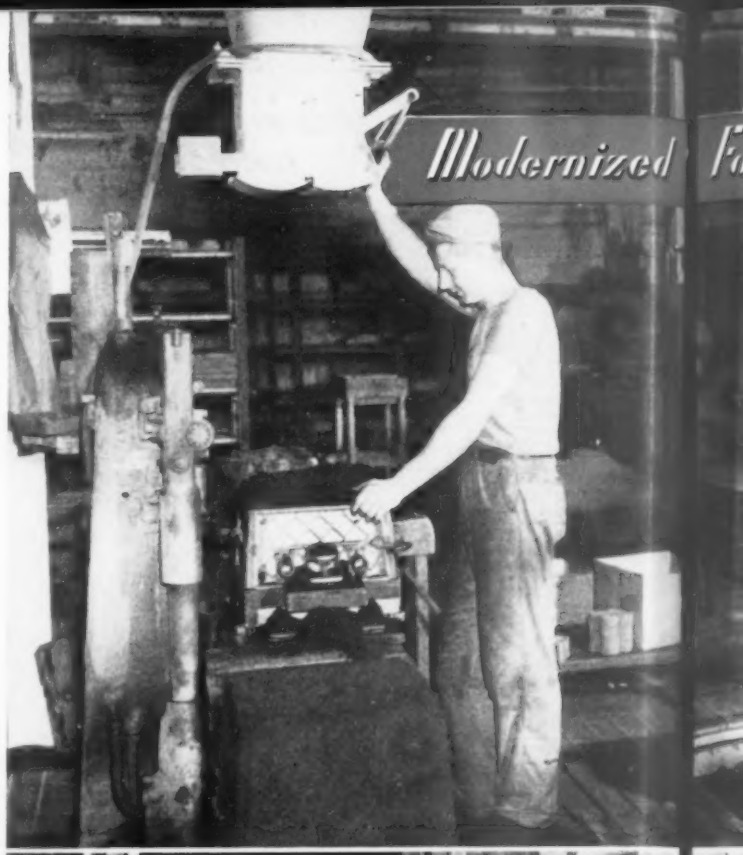
Sand from the storage bins is discharged through bottom gates onto a conveyor belt and transported to the muller where necessary additions of bentonite, seacoal, wood flour and moisture are made. After preparation the sand is discharged onto a cross con-

veyor belt which elevates it to another belt traveling above the sand hoppers at the several molding stations. In a similar manner the borings are discharged from the bottom gates of the bins onto a conveyor belt and elevated to a 5-ton storage bin above and to one side of the electric furnace. As may be expected the points of discharge from the main storage bins of both molding sand and borings onto the conveyor belts develop considerable dust. Having the discharge gates isolated from the main foundry prevents dispersion of that dust and permits easy removal by an exhaust system.

The 4-ton electric arc furnace in which borings are melted is located near the pouring station, as shown on the floor plan. Roof section at that point is about 30 ft high, and four propeller-type exhaust fans mounted in the roof maintain forced ventilation. The latter is quite effective in removing the cloud of black smoke emitted when the addition of borings is made to the furnace.

Borings are transported from the main storage bins to the furnace supply hopper on inclined conveyor belts. The furnace supply hopper with a capacity of 5 tons is discharged into a weigh hopper or larry directly beneath it. Borings from the weigh hopper are emptied into a 12 in. diam sheet steel pipe (Fig. 8) which discharges them through an opening in the roof of the furnace. This pipe is arranged so that it may be raised out of the way when the furnace is tilted. Bottom gates on both supply hopper and weigh hopper are air operated and controlled from the furnace floor level where the dial scale also is located.

Procedure in melting is to charge the cold furnace in the morning with about 4 tons of return sprues, gates and risers from the previous day's heat and melt it down. An analysis is made by spectroscopic method except for carbon and sulphur, and any necessary adjustments are performed to bring the composition to approximately 3.50 per cent TC, 2.40 per cent Si, 0.70 per cent Mn, and 0.60 per cent P. The heat then is brought up to the desired tapping temperature of about 2750° F, and pouring is begun. Pouring temperature is around 2650° F, and after 1500 lb or so of iron has been removed from the furnace, the first addition of cast iron borings is made. Quantity added is 1500 lb, and a minute or so after the addition, the door at the back of the furnace is opened to permit the distribution of the borings over the bath by means of a wood rabble. Furnace door is closed, and about two or three minutes more are allowed to insure solution of the borings, whereupon



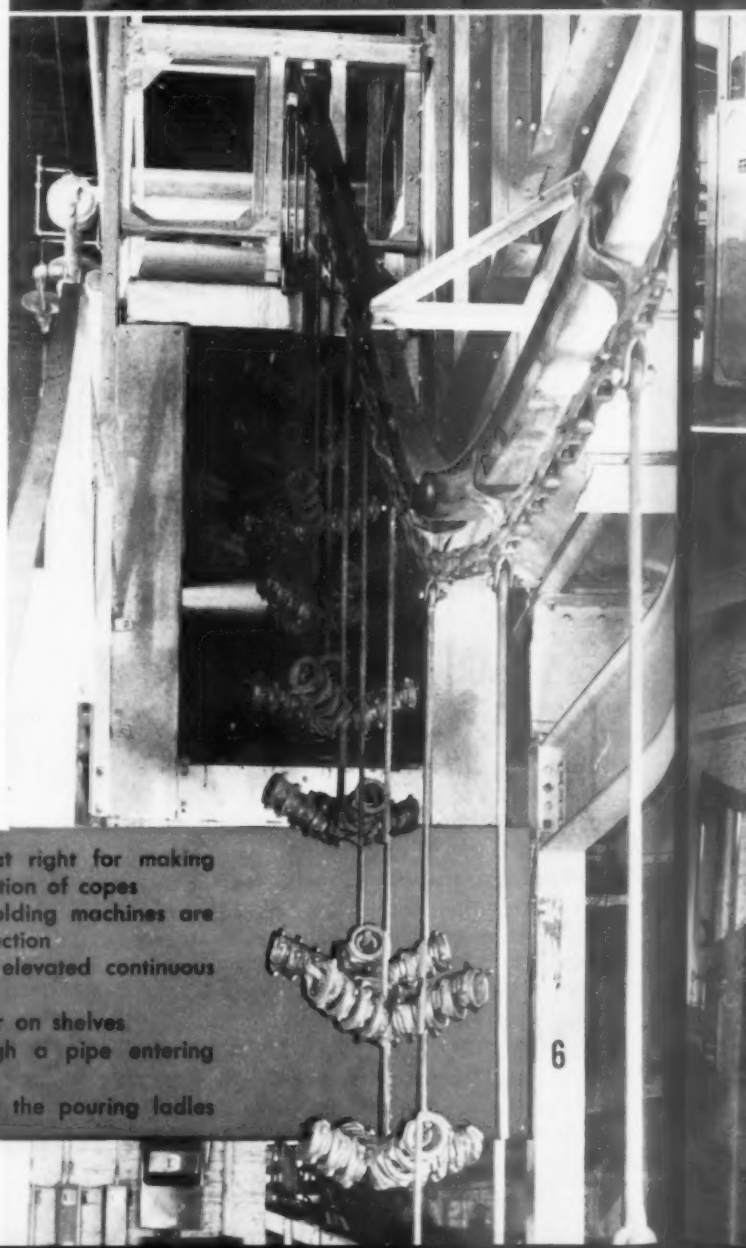


Fig. 4—Molding line showing jolt rollover machine at right for making drags, and push-off, pin lift machine for production of copes
Fig. 5—On certain types of castings squeezer type molding machines are found most satisfactory for mold production
Fig. 6—Casting conveyor line at the entrance to the elevated continuous type annealing furnace
Fig. 7—Combination core oven bakes cores on racks or on shelves
Fig. 8—Borings are charged into the furnace through a pipe entering a hole in the roof
Fig. 9—Metal from the electric furnace is tapped into the pouring ladles

ed Foundry
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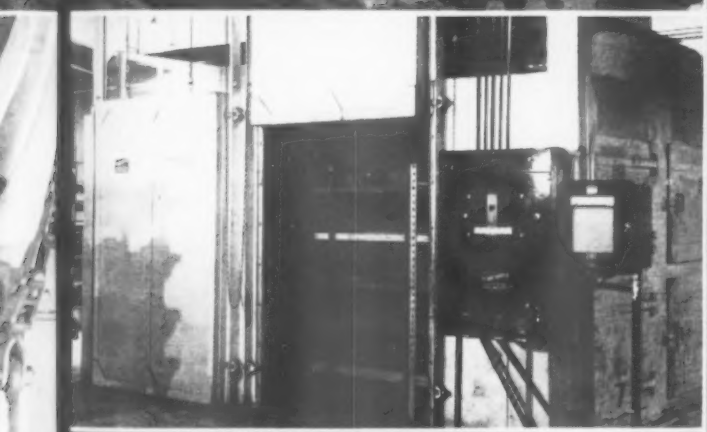

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Modernized Foundry

Fig. 10—Mold carrying pallet is tilted and mold slides onto shakeout screen

Fig. 11—Casting conveyor from shakeout passes through wall

Fig. 12—Outside end of casting conveyor with tote box for debris

Fig. 13—Castings are cleaned in barrel-type abrasive blast machines

Fig. 14—Cereal, bonding material, etc., are elevated to second floor

Fig. 15—Handling equipment for sand at left, and borings at the right

Fig. 16—Mulling machine for preparation of molding sand

tapping is started again.

Additions of borings are made approximately every 10 minutes, although the time may vary somewhat depending upon the rate the iron is taken from the furnace to pour castings. Specimens are taken from the furnace every hour and analyses performed to maintain the composition at the desired level.

At the present time the iron is tapped directly from the furnace into the pouring ladles of 400-lb capacity, but later a 2000-lb capacity holding or mixing ladle will be interposed between furnace and pouring ladle. Holding ladle will be of the elongated or barrel type, insulated and covered to keep the temperature drop to a minimum. Pouring ladles are suspended from an overhead tramrail system as illustrated in Figs. 3 and 9, and pouring is done from a moving platform shown in Fig. 3.

An ingenious method for shifting mold weights is partially shown in Fig. 3. As may be observed, the weights are suspended from an overhead rail and chain system in pairs on 30-in. centers. Jointed at three points, namely where the suspension rod is attached to the spacing bar at the top, where the rod is attached to the bail of the weight, and finally where the bail is attached to the weight, the weight-shifting device permits application of the weights to molds ranging in height from 9 to 30 in.

Movement of the weights is synchronized with that of the molds on the conveyor. The overhead rail from which the weights are suspended is curved sharply in the vertical plane at both ends so that the ends and the straightaway opposite the pouring side are about 12 in. higher than the straightaway where the molds are poured. Consequently, as the molds arrive under the weight-shifting system, the weights are just a few inches above the tallest mold, and as the mold conveyor moves the weights descend until at a distance of 5 ft from the point of entry, the weights are resting solidly on the molds.

Positions assumed by weights, bails and rods are depicted in Fig. 3 and in the closer view in Fig. 2. The latter also shows the method of attachment of rod, bail and weight. Another feature of the weight-shifting system is the design of the weights. While all alike, the weights are arranged to accommodate at least six different locations of sprues. Consideration of Fig. 2 will indicate how this is accomplished.

Molds are produced on a molding line comprising five jolt-squeeze, rollover-draw, three jolt-squeeze, power-strip, and two jolt-squeeze, pin-strip machines which are arranged alternately in pairs, and six jolt-squeeze machines. They are located as shown in Fig. 5 in a line and over a grating in the floor which permits any spill sand to drop onto a conveyor belt beneath. Molding sand hoppers above each machine permit the operator to drop any desired amount of sand into the flask by manipulation of the quick opening and closing bottom gates.

Snapflasks are used exclusively for mold production, and the molds after being made are carried about 3 ft to the mold conveyor which is elevated about 18 in. above the floor level. Molding conveyor is the car type (Fig. 4). Each car is about 5 ft long and contains two corrugated cast iron pallets carrying the molds. The pallets are 18 x 30 in. and located on 30-in. centers, the same spacing as that employed on the weight-shifting system previously described. Pallets are hinged near the outside edge, with a roller attached to the back or inner edge of the conveyor. Those are (*Please turn to page* 280)

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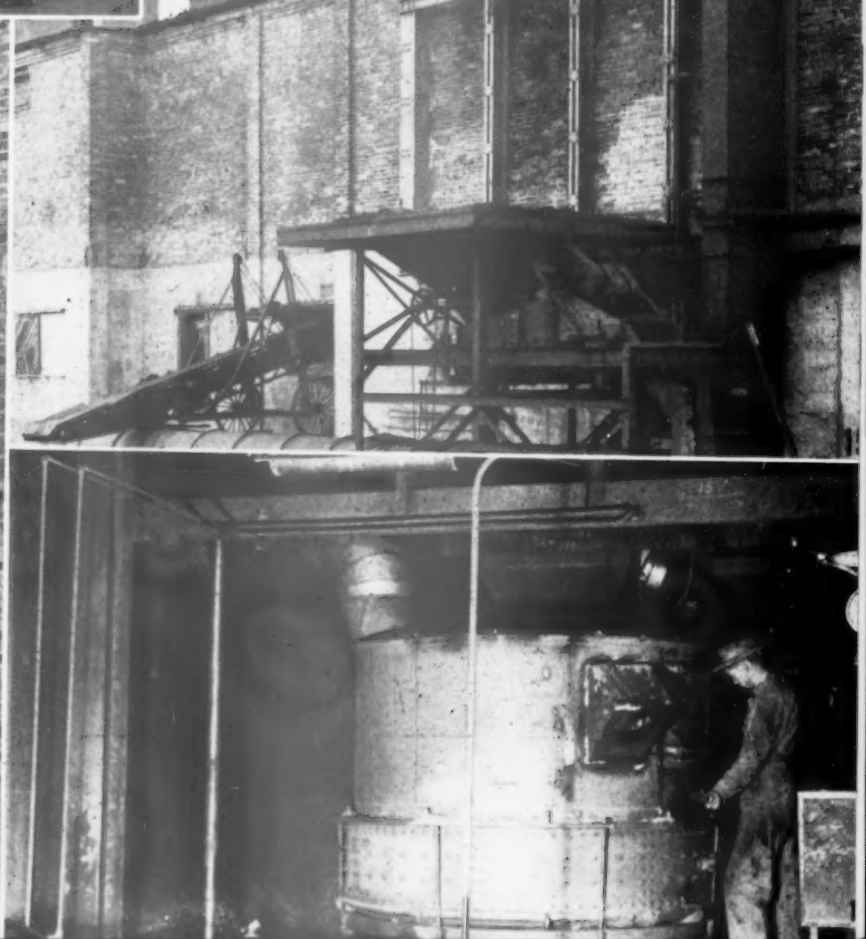


The Veteran

"Most of them do better work in their classes than the civilians"

"The veterans have gone out of their way to co-operate, even with the faculty"

n looks at Jobs— and Employers

By CLEMENT J. FREUND
Dean, College of Engineering
University of Detroit

THE veteran is without any question the most important figure in the foundry industry today; he is the most important figure in any industry and, indeed, in the whole American scene. What he thinks about foundry operators and foundry jobs concerns all of you for the simple reason that practically all the men in your shops will be veterans before you have time to think about them.

The great majority of American young men served in the Army or the Navy. There are more than 2600 students of engineering in the University of Detroit. The last time we made a check we found that 78 per cent, or four in every five, were veterans of the armed forces. It is my guess that about four out of five are veterans in any average group of American young men. In another two or three years these lads will complete their education; and right after that they will surge into the shops and factories to take over as the new generation in the industries of the United States.

Now, what manner of men are these young veterans of the war? I shall give the best answer I can, but remember that I can report only my own opinion, and others might not agree. I believe, though, that almost everybody who has had experience with veterans will tell just about the same story.

During the last year and a half I have had the opportunity of speaking personally with hundreds of the veterans, and they (*Please turn to page* 205)

"You can't ignore the veterans, or stick your head into the sand about what they want and think and are trying to do"

Expansion of SILICA SAND

By HERBERT H. FAIRFIELD
Foundry Consultant
Harry W. Dietert Co.
Detroit

Greatest stress in a mold face exists in the silica sand layer at 1100° F, the author points out. To overcome casting defects caused by cracking or spalling of the mold face it is necessary to reduce the sand's expansion or lower its compressive strength at that temperature

CASTING defects attributed to cracking or spalling of the mold face are termed rat tails, buckles, scabs and dirt.

In order to understand what causes mold surface cracks, it is necessary to study the thermal expansion characteristics of silica sand mixtures.

All foundry sands are silica or quartz, in various degrees of purity. Silica is the cheapest available material having sufficient refractoriness to withstand molten metal temperatures. The reaction of silica to heat is, therefore, of great concern to foundrymen. Silica, also known as quartz, expands only .0014 per cent per degree F, when heated in the range from 50° F to 1000° F. As silica is heated from 1000° F to 1200° F, its rate of expansion increases sevenfold to .01 per cent per degree F. Silica does not expand when heated above 1200° F.

Sand Expands Rapidly at 1100°F.

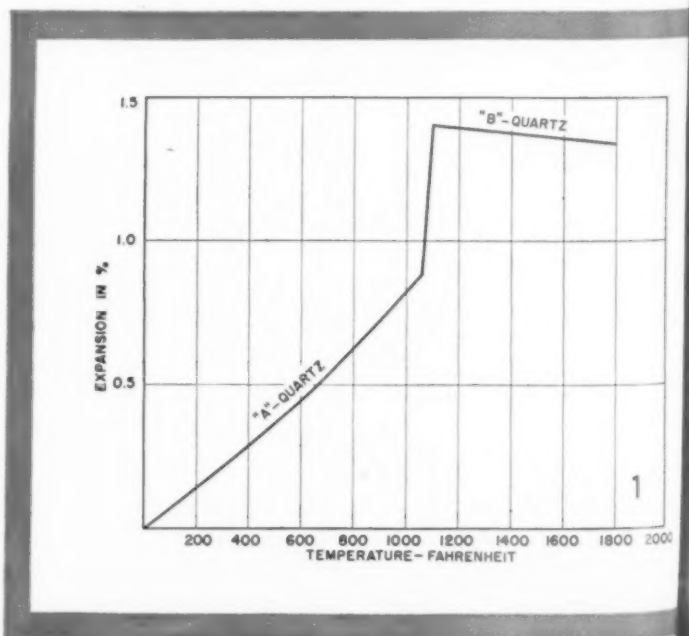
Fig. 1 (*Journal* of the American Ceramic Society, November, 1947, Part II, p. 19) shows the expansion curve for quartz, the form in which silica sand usually exists.

An expansion curve of ordinary molding sand is shown in Fig. 2. Examination of a considerable number of sands has shown that the rapid rate of expansion at 1100° F is typical of core and molding sands used in the United States and Canada.

The critical point in silica sand was not evident in expansion testing until the hollow test specimen was developed. The hollow specimen can be heated to a uniform temperature. Fig. 3 shows the method used to ram the specimen. It is contained in a silica tube; the hole in the specimen is made with a rod supported by a spring. The greatest amount of stress must exist in a mold face in the layer of sand that has reached 1100° F. If the surface of the mold cracks or spalls, it does so because of the properties of the sand at 1100° F. Compressive strength of the sand at 1100° F would be a determining factor in controlling the tendency of the sand to fail due to heat shock. A sand which is soft at 1100° F would not be adversely affected by expansion since the sand would have enough ductility to dissipate stresses due to expansion. A sand which was hard and brittle at 1100° F would not dissipate stresses due to thermal expansion and hence would be expected to crack or spall on exposure to heat.

Rat tails, buckles, scabs and dirt are casting defects attributed to cracking or spalling of the mold face. Elimination of these defects is dependent upon reduction of expansion of the sand or lowering the compressive strength at 1100° F.

The most logical method of controlling expansion and hot strength properties is to examine and select raw materials carefully. Available molding and core sands differ greatly in these properties. The hot



strength and expansion of synthetic sands can be controlled by the selection of clay or clays that are used.

In cases where a remedial treatment is needed for a molding sand in a foundry, the following possibilities should be considered:

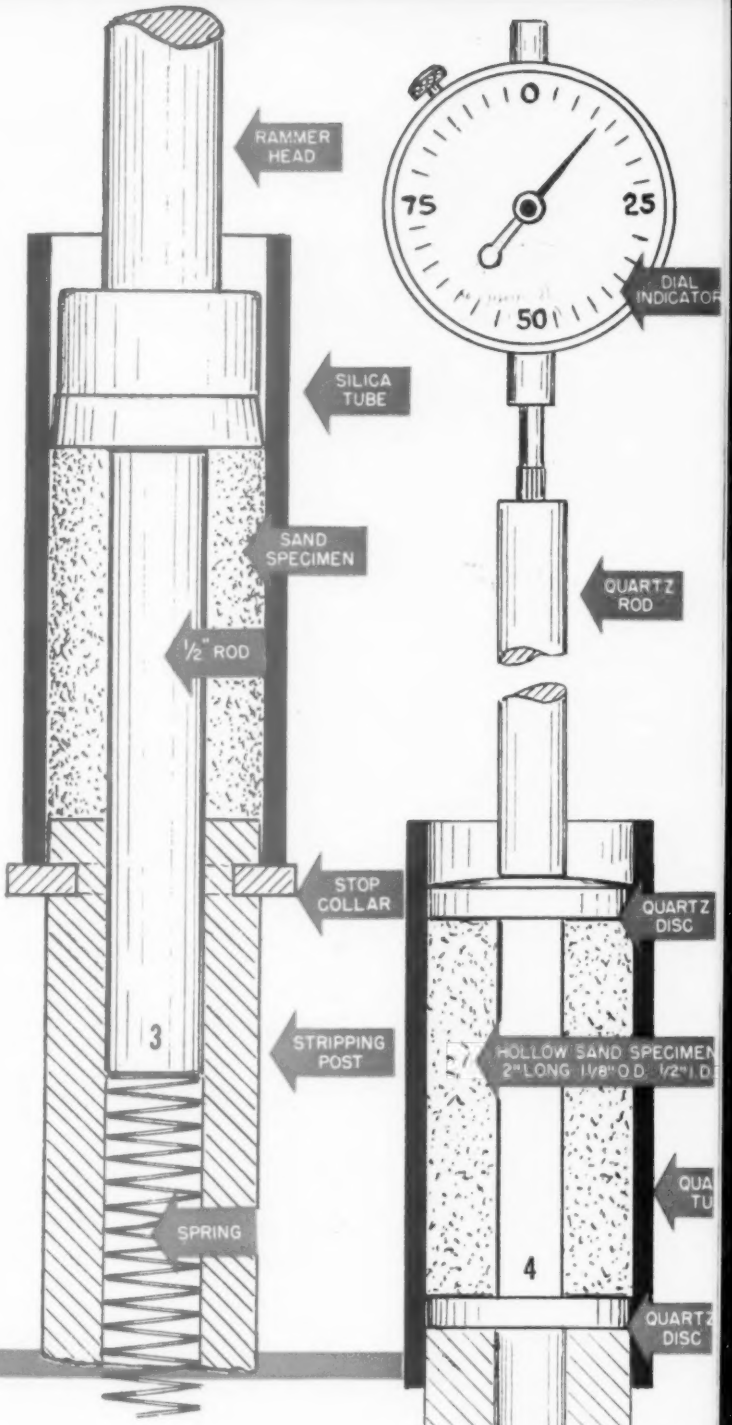
Softer ramming will reduce hot strength and prevent spalling. Any bulky cellulose material added to the sand will shrink as it is heated, thus allowing sand grains to expand freely. Cellulose material will also lower hot strength by reason of the voids left as it burns. Wood flour, bark flour, powdered corn cobs, bran and other materials will reduce the tendency to form rat tails and other expansion defects. Particle size of the cellulose materials is the main consideration in determining their effectiveness. If these materials are too finely ground they will not produce the desired effect.

Reduce Expansion and Hot Strength

Cereal flour is effective in reducing expansion defects. Its action is to keep the sand grains from packing tightly together. Seacoal, pitch and coal tar have a similar effect, in that they lower expansion and hot strength.

The measurement of expansion in molding materials can be made fairly easily. It is merely necessary to expose a rammed specimen of sand to a temperature of 1500° F. Any temperature between 1200 and 1800 will give about the same result. The specimen is measured by means of a height gage using quartz rods and a dial indicator. Fig. 4 shows an assembly suitable for expansion measurement. Fused quartz is used to support the specimen and measure changes in length. The expansion of fused quartz is very low compared to that of sands.

For scientific study, a hollow cylindrical specimen is considered necessary. For routine foundry tests a solid specimen 1⅛ in. diameter and 2 in. high may be used. Care must be taken that the specimen is heated slowly enough so that it does not crack.



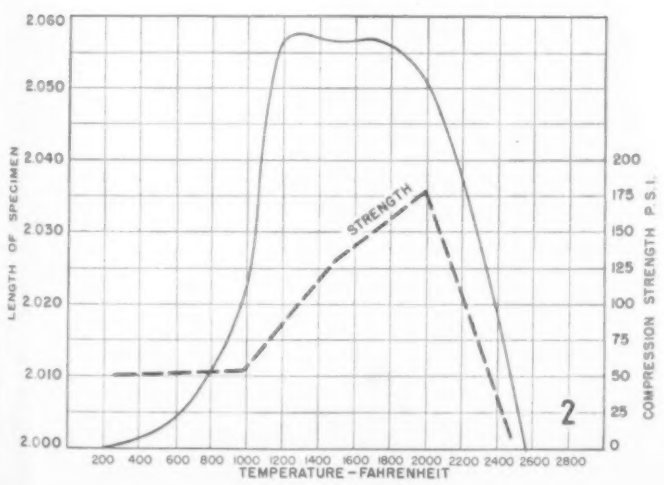


Fig. 1—Chart illustrating the thermal expansion of silica

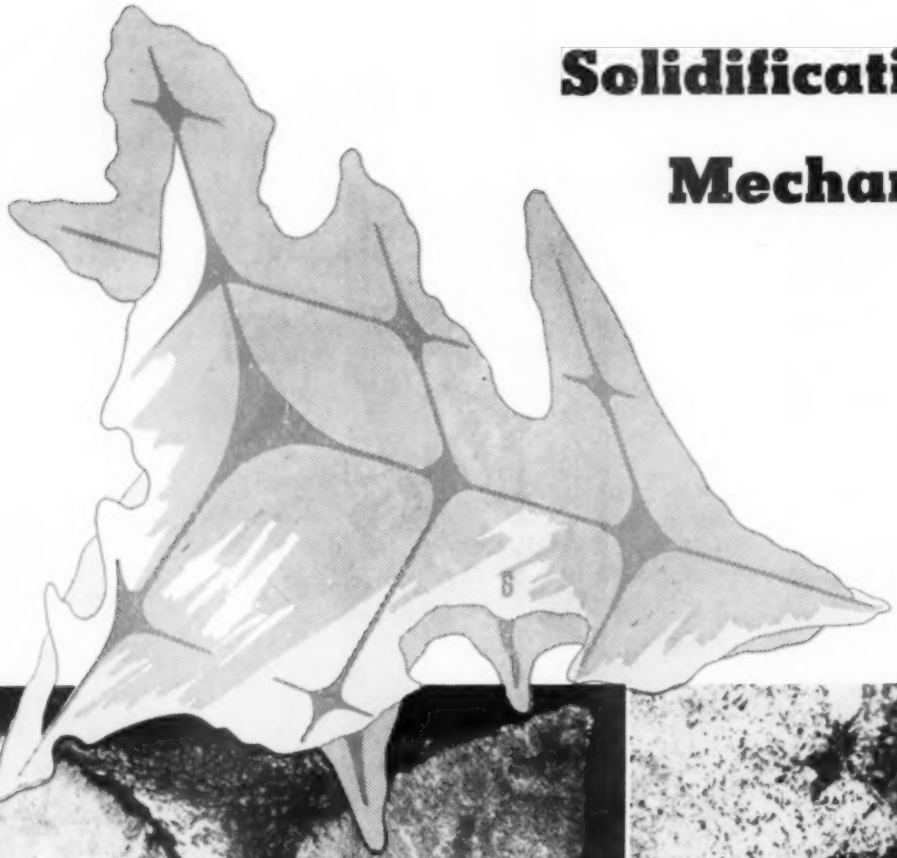
Fig. 2—Expansion curve of molding sand when heated

Fig. 3—Method used to ram the sand specimen

Fig. 4—Assembly suitable for expansion measurement

Solidification Mechanism of Tin

By CLYDE L. FREAR
Senior Materials Engineer
Bureau of Ships, U. S. Navy
Washington



Further discussion of important considerations in the production of tin bronze castings is included in this second and concluding article covering the mechanism of solidification. The first installment appeared in April

Bronzes

WITH the method of grain formation described in the previous article in mind, we should expect the cross section of a casting to show an outer, comparatively thin layer of fine-grained metal, an intermediate zone of coarser grains which lie at right angles to the mold walls, and an inner zone of randomly arranged grains. Depending upon a number of variables, the actual dimensions of these zones will vary, the comparative grain size will also vary and, in some cases, one or two of the zones may be entirely absent. Usually there is a fairly sharp line of demarcation between the chilled and the adjacent columnar zones, but the separation between the columnar and the inner random zones may be very indistinct.

The three solidification zones described are mentioned because they evidently have considerable influence upon the presence of the type of defect under discussion. The outer zone is known to most foundrymen as the *skin*, which is considered the best protection again leakage under pressure. Most experienced designers try to provide that this skin remains on at least one surface when the casting is machined, otherwise the likelihood of leakage is greatly increased.

A comparatively thin casting, poured into a chill mold, will usually be made up almost entirely of this fine-grain metal and little or no trouble will be experienced regardless of how much of the skin is removed. It appears then that the porosity is usually limited to the interior zones where the distinct dendritic growth has occurred. It will be advantageous, therefore, to develop some method of controlling the growth of these dendrites—it being manifestly impossible to pour all castings in chill molds—yet all want to produce castings which will not leak, especially as there are few castings which are used without some machining. It should also be borne in mind that purchasers will probably be calling for castings which will withstand higher and higher pressures.

It is true that few foundrymen are limited in production to the manufacture of pressure castings. It is also true that all are called upon at one time or another to make such castings. For those whose regular production is not of this type of casting, the time to determine the proper method to do a satisfactory job is *now*, rather than at some future time when there is a rush order for pressure castings. This is especially true when it costs no more to produce a sound casting than it does to make one which will leak under test. When the cost of possible rejections is considered, the correct foundry technique is usually the more economical.

In certain cases, when examining cast bronze under the microscope, the author has noted a tendency to a grain formation showing a square, cellular structure, similar to that shown in Fig. 12. This micrograph, at 40 diam shows the internal structure of a single grain, the continuous right angle arrangement of the axes being especially evident.

For some time it has been the author's opinion that interdendritic shrinkage is due to an inherent growth tendency of the dendrites which cuts off feeding between the various branches, but up to the present time, nothing could be found to substantiate this belief beyond the microscopic studies which, in themselves, do not necssarily indicate the true dendritic growth. A short time ago, while studying the shrink-

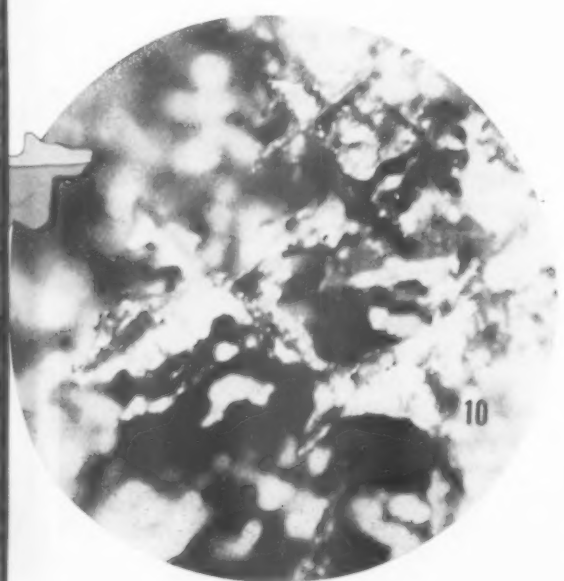


Fig. 6—Sketch of additional dendrite in pipe of riser shown in Fig. 7

Fig. 7—Shrinkage cavity in gun metal riser showing pipe and porous metal

Fig. 8—Micrograph of riser shown in Fig. 7 illustrating cellular structure

Fig. 9—Enlarged sketch of dendrite shown in Fig. 10

Fig. 10—Free growing dendrite located in riser pipe shown in Fig. 7

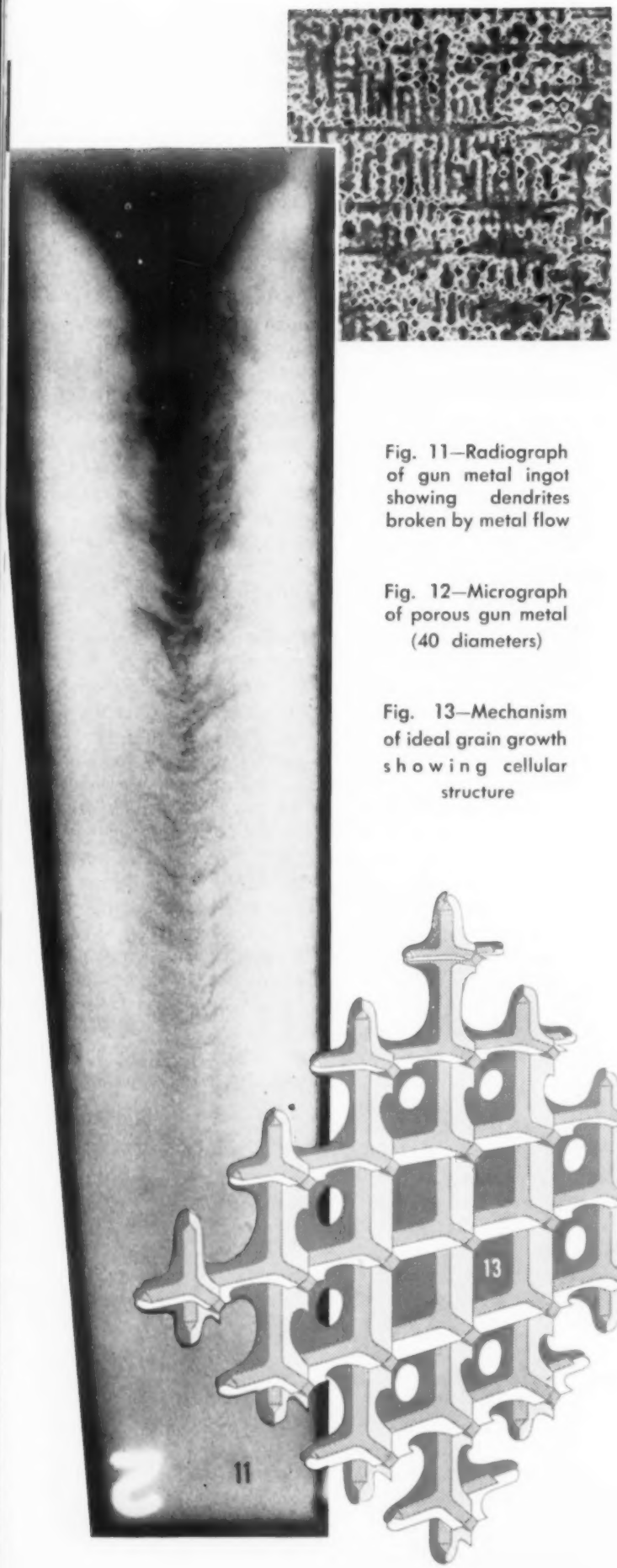


Fig. 11—Radiograph of gun metal ingot showing dendrites broken by metal flow

Fig. 12—Micrograph of porous gun metal (40 diameters)

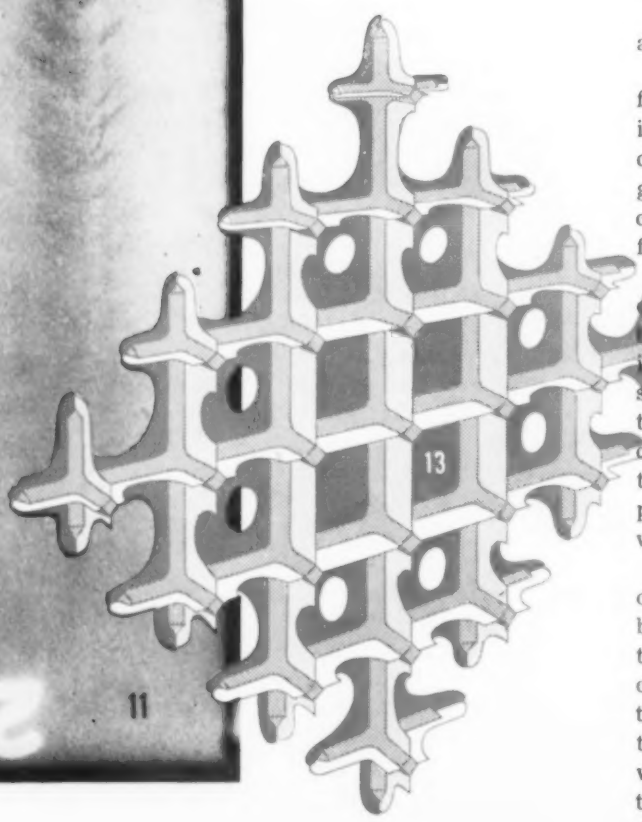


Fig. 13—Mechanism of ideal grain growth showing cellular structure

age cavity in the gun metal riser shown in Fig. 7, a number of tiny crystals were found adhering to the walls of the shrinkage cavity or "pipe." A photograph of one of these crystals is shown in Fig. 10 and offers what the author considers as proof that shrinkage porosity in the tin bronzes is due mainly to the peculiar mechanism of dendritic growth. Fig. 9 shows a greatly enlarged sketch of this dendrite, drawn directly from an examination through a binocular microscope. Fig. 6 is a similar sketch of another dendrite lying nearby, but in such a position that it could not be photographed successfully. The riser illustrated had been covered with powdered gypsum (an excellent heat insulator) during solidification. As evidenced by the pipe cavity, a considerable amount of feeding had been obtained but still not to the extent which is usually possible with most metals and alloys.

Dentrites Formed High in Riser

A study of Figs. 6 and 9 indicates that the dendrites were formed higher up the riser, in the zone of random growth mentioned previously. After growing to the size shown (actual size was somewhat less than 1/16-in. in greatest dimension) they were evidently trapped on the walls of columnar growth and the mother liquor drawn away, thus stopping grain growth and leaving the crystals exactly as they were at the instant that growth ceased. Certain characteristics can be noted from a study of these grains:

(a) The crystals grow rapidly and uniformly along three axes which lie at right angles to each other.

(b) Numerous secondary axes grow at right angles from the primary axes and at fairly regular intervals.

(c) Traces of tertiary axes grow from the secondary axes.

(d) Between these various axes there tends to be formed a continuous membraneous wall with further indications that the growth of this wall actually precedes that of the axes. If these walls continue to grow in the same fashion, they will form a series of cubical cells which would be capable of preventing further access of molten metal.

Further assumptions can also be made. As the cavity in the riser was formed in a very short time, the time required for the growth of the dendrites illustrated was probably not more than two or three seconds. With such rapid growth in mind, consider then the extent of growth possible with a single dendrite under slow cooling conditons such as obtained when the casting represented by Fig. 12 was poured. The dendrite represented by this micrograph was approximately ½-in. in length.

Fig. 13 is a sketch showing the author's conception of the mechanism of ideal unhindered growth of a tin bronze, based upon the foregoing illustrations and the assumptions made therefrom. The sketch indicates the cross section of such a grain or dendrite taken through the layer of cells lying adjacent to the main axes, but does not include the filler metal within the cells. If this conception is correct, once the six walls are completely formed around a cell, further feeding of that cell (*Please turn to page* 348)

The Role of Management *In Independent Enterprise*

By WILLIAM H. WORRILOW
President
Lebanon Steel Foundry, Lebanon, Pa.

AT THE turn of the century professional economists were listing only three major factors in the production of economic goods. They spoke of *land* in a generic sense, including in its meaning all natural resources such as air, water, climate, minerals and soil; they spoke of *labor* as an indispensable factor, even in the most elementary kind of production; *capital* they acknowledged as the third factor in modern industrial enterprise, defining capital as any form of material wealth which is used to increase the total of material wealth. Today these factors remain as the foundation stones of elementary economy.

The twentieth century economist has been forced to recognize a fourth factor which has come into existence through large-scale production. The fourth cornerstone of production is *management*. Today, as we approach the middle of the century, this fourth factor assumes an importance which places it in an equal position with the other three in the four-square of a sound industrial structure.

The role of management is clearly discernible in huge corporations. There its responsibility is primarily to the stockholders, who, in the aggregate, constitute the capital factor. *Capital* appoints *management* and measures success or failure in terms of profits. In many cases capital owns or controls the land factor, assuring to itself a constant supply of raw materials and eliminating some of the costs which would be present if materials had to be purchased in the competitive market in which raw materials are sold. It is apparent, therefore, that in such corporations three of the four factors are closely allied. Capital owns land and appoints management. The profit motive activates the enterprise and it is management's charge to show profits.

In independent enterprise management is charged with the same responsibilities to show profits, but there are distinct differences in the relationship which exists between the various factors of production and there are additional obligations which wise management assumes, whenever invested capital and business management are lodged in the same person or persons.

WILLIAM H. WORRILOW, president of Lebanon Steel Foundry, Lebanon, Pa., was born in Chester, Pa., in 1877 and educated in public schools of that city. From 1891 to 1903 he was employed by the American Steel Casting Co., Chester, starting as junior clerk and advancing to assistant district manager of the eastern district plants of the company. The ensuing four years Mr. Worrilow was sales manager of the Solid Steel Casting Co., Chester, and from 1907 to 1911 was sales manager of the Lebanon (Pa.) Steel Casting Co. In the latter year, with T. S. Quinn, he founded the Lebanon Steel Foundry, assuming the position of president which he still holds. From the plant's original capacity of 10 to 25 tons of castings a month when it began operations in February, 1912, capacity has been increased to more than 1000 tons of carbon and alloy steel castings monthly. Mr. Worrilow was president of the Steel Founders' Society of America in 1931-32 and of the Alloy Casting Institute in 1940-44.

The owner-manager is an entrepreneur. He organized the enterprise, determines policy and carries plans through to conclusion. The professional manager enters an industry after it is organized; he may recommend policy but the final decision rests with a board of directors who are elected by stockholders; he attempts to carry out plans but may find himself replaced by another appointee before projects reach their completion. In terms of the classic factors of production the owner-manager is both *capital* and *management*. When his operations include the ownership of the sources of raw materials he may also be *land*. The professional manager is none of these because his services are subject to capital.

The successful management of an independent enterprise in modern times requires a combination of skills rarely found in one individual. He must accumulate as well as manage capital; he must be an entrepreneur in so far as he assumes all risks, but government agencies regulate or limit his profits through taxation; he will, if he is wise, operate on a budget as corporations (*Please turn to page* 202)

Fig. 1—Typical Type A graphite. X100; unetched

Fig. 2—Typical pearlitic (eutectoid) structure which produces good wear resistance. X500; etchant picral plus HCl

Fig. 3—Typical Type D graphite which produces poor wear resistance. X500; etchant picral plus HCl

Fig. 4 — Graphite distribution in Composition A. X100; unetched

Wear Resistance

OF GRAY IRON DIESEL ENGINE LINERS

By T. E. EAGAN
Chief Metallurgist
Cooper-Bessemer Corp.
Grove City, Pa.

Important influence of metallurgy on wear resistance of gray iron is discussed here by the author. Incorporated in his data are results of a series of actual service tests on 90 different liners of seven different analyses

GRAY iron has for many years been the standard material used to resist metal-to-metal wear in lubricated sliding friction. Practically all cylinders, cylinder liners, and engine blocks where the cylinders are integral with the block have been made of gray iron. However, it has only been in relatively recent years that the influence of metallurgy on this type of wear has been given a great amount of study.

The literature is replete with articles on wear resistance of various materials, and the theories on the cause of wear. A thorough study of these will bring out the main fact that wear is caused by such things as corrosion, abrasion, erosion and just plain friction between the two rubbing parts. No general theory applicable to all cases has been propounded. Various types of operation will emphasize one or the other of these factors, and many times the conclusions drawn by the various investigators are rather perplexing because of the fact that insufficient consideration had been given to all of the factors that influence wear. However, a general consensus is that improvement in wear can be accomplished along two main channels, namely, mechanical design and metallurgy. Both can accomplish a great deal. We wish here to discuss some of the metallurgical aspects.

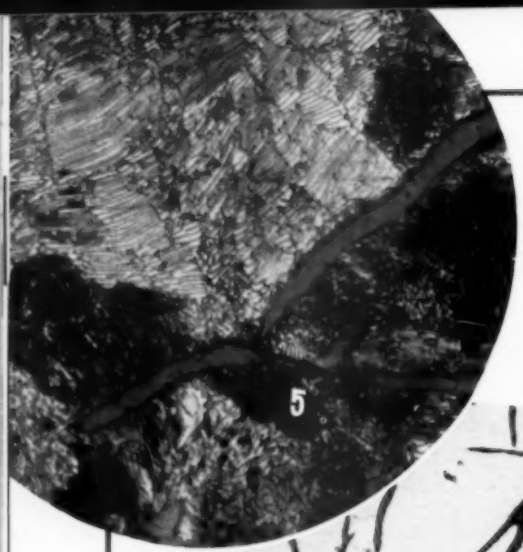
It is believed that P. S. Lane[1] was one of the first to point out that the microstructure of the iron had a profound effect on the wearing qualities. He showed that the best wearing irons had a random flake (AFA—ASTM Type A) graphite distribution, as shown in Fig. 1, with a matrix which was purely pearlitic (eutectoid) in structure, as shown in Fig. 2. He also illustrated that type *D* graphite distribution with its corresponding ferritic structure, as shown in Fig. 3, had very poor wearing qualities.

The work of Lane was later confirmed by E. K. Smith[2] who studied the wear experienced in operating automobile engines and correlated the results with chemical analysis and microstructure. The work of these two investigators has been so well confirmed that it has become axiomatic to state that the best wearing gray iron must have random flake graphite and a truly pearlitic structure.

Some years ago the author felt that the influence of composition and microstructure on wear was not completely known. It was further thought that it was necessary to use alloys in liner iron, but the information on their proper use as to type and amount to improve wear was rather meagre. Most of the information on this subject was based on accelerated tests. In consequence a wear testing program was initiated which we hoped would give sufficient data to allow us to evaluate wear with chemical analysis and microstructure.

Accelerated tests have proved to be an excellent medium of evaluating wear if all tests are run on the same machine. The correlation of the results with actual service experience is difficult chiefly because service conditions cannot be duplicated exactly. Actual service tests are difficult and expensive to run. One engine may be so located in a field where no difficulty with dust and dirt in the air will be experienced; another may be where there is an extreme amount of dust and sand; another may be using a corrosive fuel; another may be in marine service where salt water atmospheres can cause cor-

Wear Resistance



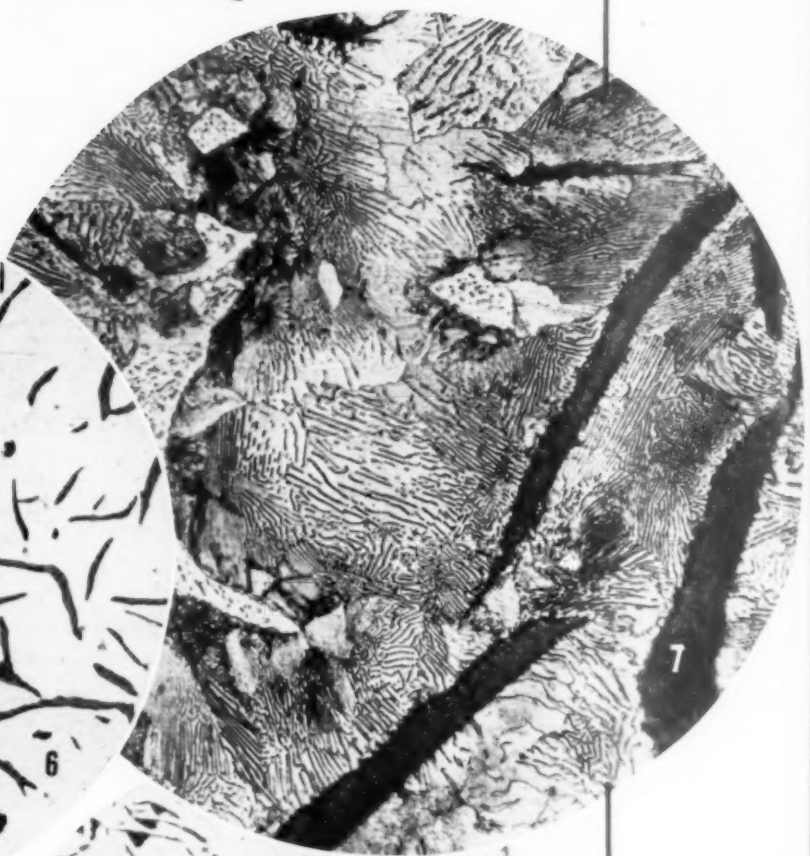


Fig. 5 — Matrix microstructure of Composition A. X500; etchant picral plus HC1. Typical analysis: TC 3.11%, Si 1.30%, Mn 0.97%, P 0.13%, S 0.11%, Cu 0.80%. Tensile strength 50,000 psi. Brinell hardness 229

Fig. 6—Graphite distribution in Composition B. X100; unetched

Fig. 7—Matrix microstructure of Composition B. X500; etchant picral plus HC1. Typical composition: TC 3.27%, Si 1.69%, Mn 0.79%, P 0.42%, S 0.11%. Tensile strength 37,500 psi. Brinell hardness 190

Fig. 8—Graphite distribution in Composition C. X100; unetched

Fig. 9—Matrix microstructure of Composition C. X500; etchant picral plus HC1. Typical analysis: TC 3.15%, Si 1.34%, Mn 0.92%, P 0.08%, S 0.06%, Ni 1.05%, Cr 0.24%, Mo 0.28%. Tensile strength 57,700 psi. Brinell hardness 235

rosion; another may operate under conditions of fluctuating load, etc. All of these conditions may influence the wear rate of liners. Furthermore, it is not very easy to follow liners which are put out in service, because in most cases operators are more interested in keeping their engines in operation and are not willing to allow them to be shut down for the lengthy inspection required to determine wear rate. Finally, measurements of wear of liners that are installed in engines are difficult to take.

In spite of these objections we adopted actual service for our wear testing. It was thoroughly believed that broad average results under various service conditions would be more valuable to us than those obtained otherwise. We ran into all of the difficulties enumerated above and more, yet the results obtained indicate in a rather precise pattern the wear resistance of the various analyses of materials used.

A survey of the various service conditions under which our engines were operating showed the following:

1. Bad atmospheric conditions such as experienced in dust storm areas in the oil fields. The excessive wear experienced in this field can be caused by sand and dust getting into the engine through various openings such as the air intake. It had been previously proved that proper filtration and cleaning would eliminate most of the abrasive wear experienced. Hence, we did not use many engines in service in this field because we were not interested in producing liners to overcome abrasive wear. This is a problem which the owners of the engines could solve more easily by the proper conditioning of the air used for combustion.

2. Varying load requirements. This is a fertile field to study wear resistance. If we could improve wear under this condition of operation we were certain that the same could be accomplished under conditions where the operating load is constant.

3. Marine service. Fishing boats, tugs, etc. are operated under rather corrosive atmospheric conditions, especially during rough weather at sea. Salt water is a bad corrosive medium.

4. Corrosive fuels. A number of our engines operated with corrosive fuels, either high sulphur oil or high sulphur gas, the most drastic being gas engines operating on sewer gas with a very high content of hydrogen sulphide. This is another field where we felt that some improvement could be made.

Test engines were chosen in the last three fields chiefly because we believed that they were the most extreme as far as wear resistance of cylinder liners was concerned.

Severe Service Encountered in Locomotives

Experimental liners were placed in four switching locomotives because these locomotives are run 24 hours per day and are, of course, subject to fluctuating load. Engines in this type of service operate under idling conditions for considerable lengths of time. Hauls are usually short, thus loading of the engines is of relatively short duration. This type of loading has been proved to be very detrimental to the wear of automobile and truck cylinders. The excessive wear in this case has been proved to be corrosion. We wished to determine if this were true in diesel engine operation.

These switching locomotives have two engines in each locomotive. These two engines are operated under exactly the same conditions. This fortunate circumstance gave us an opportunity to use duplicate liners in the same position in each engine; thus we could check our results. It also gave us the privilege of studying the effect of other variables in engine operation, such as lubrication, in that we could keep one engine running under standard or normal lubrication and compare the results obtained by changing the lubrication of the other engine.

Five engines operating in marine service were chosen for tests in this field. Three of them were in fishing service which is quite severe on wear requirements. Two others were intermittently operated to study supply power for loading and unloading large seagoing freighters. These latter two engines operated on heavy bodied fuel (Bunker "C") rather high in sulphur.

One gas engine was chosen which was operating on sewer gas which had a high hydrogen sulphide content. This engine supplied power for the operation of a large sewage disposal plant. The corrosive conditions experienced were extreme.

With very few exceptions, all these tests were on one size of four-cycle, atmospheric engines. This was deliberately done to avoid the influence of design. We wanted to study the metallurgical factors only.

We were able to obtain accurate records of 90 different liners. The operating hours ranged from 2500 to 67,770. This length of service was considered to be sufficient to average out the wear experienced during the break-in period, which is always larger than that experienced after the liners are glazed. However, no attempt was made to avoid taking this

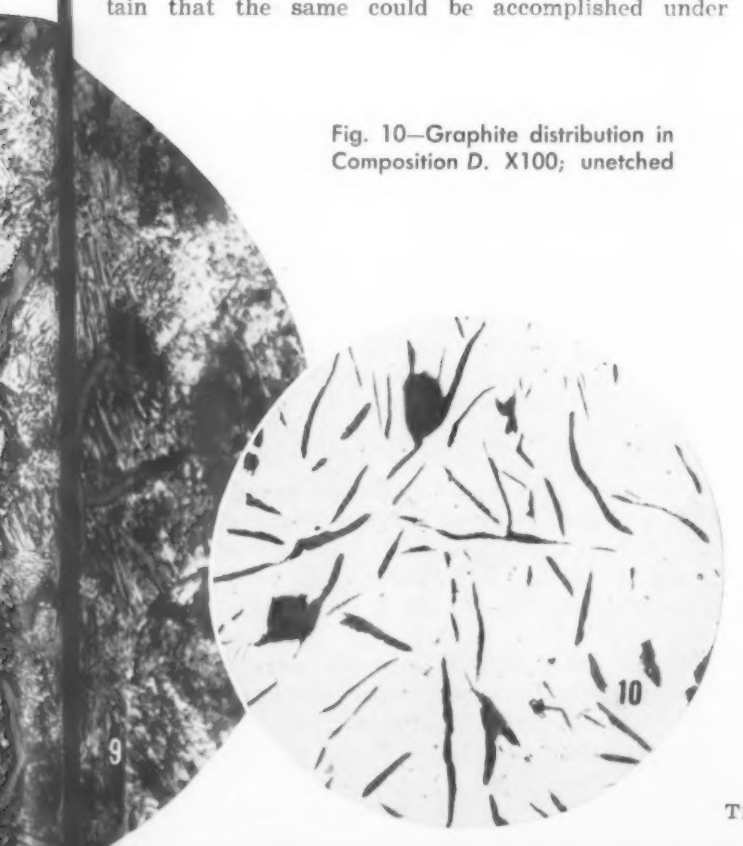
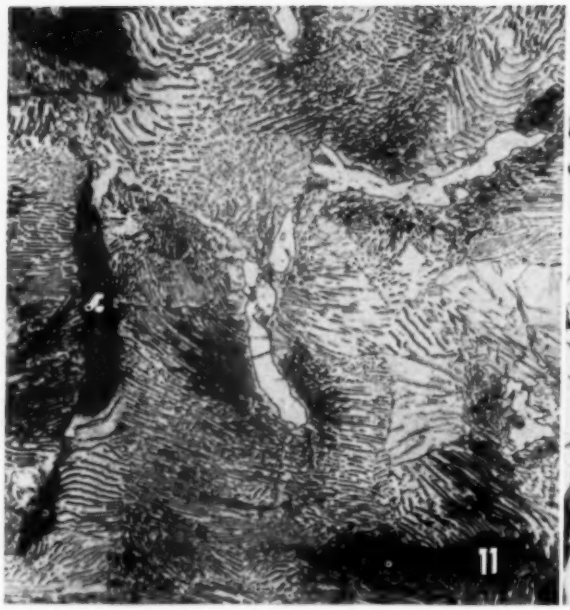


Fig. 10—Graphite distribution in Composition *D*. X100; unetched



initial wear out of the picture. We considered that total service was the one that interested us most. We obtained these service records on seven different and distinct analyses. The service was varied but in all cases it was considered extreme.

Piston Rings — The mating wear members with the cylinder in engine operation are the piston rings. Except for a few cases, all rings used were of standard manufacture with the following metallurgical characteristics:

TC 2.90-3.20 per cent, Si 2.60-3.10 per cent, Mn 0.50-0.80 per cent, P 0.40-0.70 per cent, S 0.08 per cent max. Hardness 98-103 Rockwell B.

It will be noted that this composition is very close to that used in one set of liners and designed as Composition *B*. This composition was a standard one used at that time by most manufacturers of large diesel engine piston rings. However, to eliminate the influence of differences we might experience using rings of various manufacture. We used rings made by only one concern and in many cases there were rings from one batch, which we checked and found to be quite uniform in hardness and composition.

The compositions used in the liners and why they were chosen are given below:

Composition A—TC 3.00-3.30 per cent, Si 1.15-1.35 per cent, Mn 0.90-1.10 per cent, P 0.20 per cent max, S 0.12 per cent max, Cu 0.80-1.10 per cent.

This analysis contains 0.80-1.10 per cent Cu. The copper was added for the refinement of the matrix. It was at that time, our standard composition for liners. It was therefore taken as the basic analysis for comparison of the wear results obtained.

After a rather lengthy and involved study, the analyses of the other liners we wished to test for wear were decided upon and were as follows:

Composition B—TC 3.40 per cent max, Si 1.50 per cent max, Mn 0.90 per cent max, P 0.35-0.50 per cent max, S 0.13 per cent max. This analysis was designed to test the effect of phosporus on wear resistance. It was believed that a phosphorus content of .50 maximum was all that could be successfully added to the liner material and still obtain any reasonable degree of soundness.

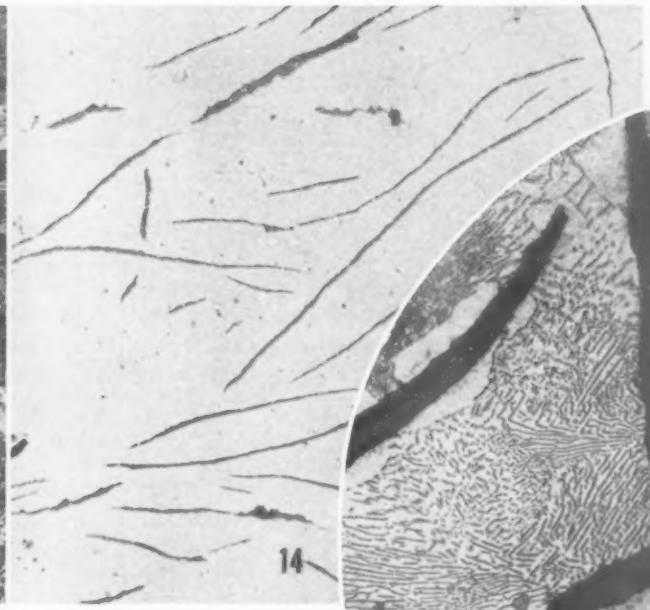
Composition C—TC 2.85-3.30 per cent, Si 1.25-1.75 per cent, Mn 0.80 per cent max, P 0.20 per cent max, S 0.12 per cent max, Ni 1.00-1.50 per cent, Cr 0.30-0.40 per cent, Mo 0.25-0.35 per cent. This analysis is a rather popular analysis for cylinder liners. Investigation revealed that it apparently was being used by others very successfully. It was therefore included in the test.

Composition D—TC 2.80-3.10 per cent, Si 4.6-5.00 per cent, Mn 0.80 per cent, P 0.20 per cent max, S 0.12 per cent max, Cr 1.90-2.20 per cent. This is an extremely high silicon and chromium content material which was reported by H. S. Young[3] to have given excellent results in England. The chromium is added to stabilize the matrix material as pearlite, otherwise the silicon would completely graphitize the iron.

Composition E—TC 3.10-3.40 per cent, Si 3.30-3.70 per cent, Mn 0.80-1.00 per cent, P 0.40 per cent max, S 0.12 per cent max, Cr 1.20-1.50 per cent. This is a modified high silicon and chromium analysis which allows a rather high percentage of phosphorus. This analysis is one that is easier to melt in a cupola than analysis *D*.

Composition F—TC 3.30-3.40 per cent, Si 1.75-2.00 per cent, Mn 0.90-1.10 per cent, P 0.20 per cent max, S 0.12 per cent max, Mo 0.40-0.50 per cent. This is an analysis in which the total carbon is rather high together with a rather high silicon. The molybdenum is added to strengthen the matrix. The theory of the use of the high carbon and silicon is to produce a large number of graphite flakes which would help lubricate the cylinder. This analysis was included to provide a partial answer to the question of whether an "open" iron is better than a "closed" iron.

All of the foregoing analyses were designed so that the liners would have a brinell hardness of between 190 and 250. This range has been arbitrarily established in our (*Please turn to page* 308)



Wear Resistance

Fig. 11—Matrix microstructure of Composition C. X500; etchant picral plus HC1. Typical analysis: TC 3.08%, Si 5.06%, Mn 0.90%, P 0.16%, S 0.08%, Cr 1.90%. Tensile strength 33,140 psi. Brinell hardness 235

Fig. 12—Graphite distribution in Composition *E*. X100; unetched

Fig. 13—Matrix microstructure of Composition *E*. X500; etchant picral plus HC1. Typical analysis: TC 3.20%, Si 3.40%, Mn 0.80%, P 0.39%, S 0.14%, Cr 1.15%. No tensile results available. Brinell hardness 223

Fig. 14—Graphite distribution in Composition *F*. X100; unetched

Fig. 15—Matrix microstructure of composition *F*. X500; etchant picral plus HC1. Typical analysis: TC 3.31%, Si 1.83%, Mn 0.92%, P 0.15%, S 0.09%, Mo 0.40%. Tensile strength 49,700 psi. Brinell hardness 220

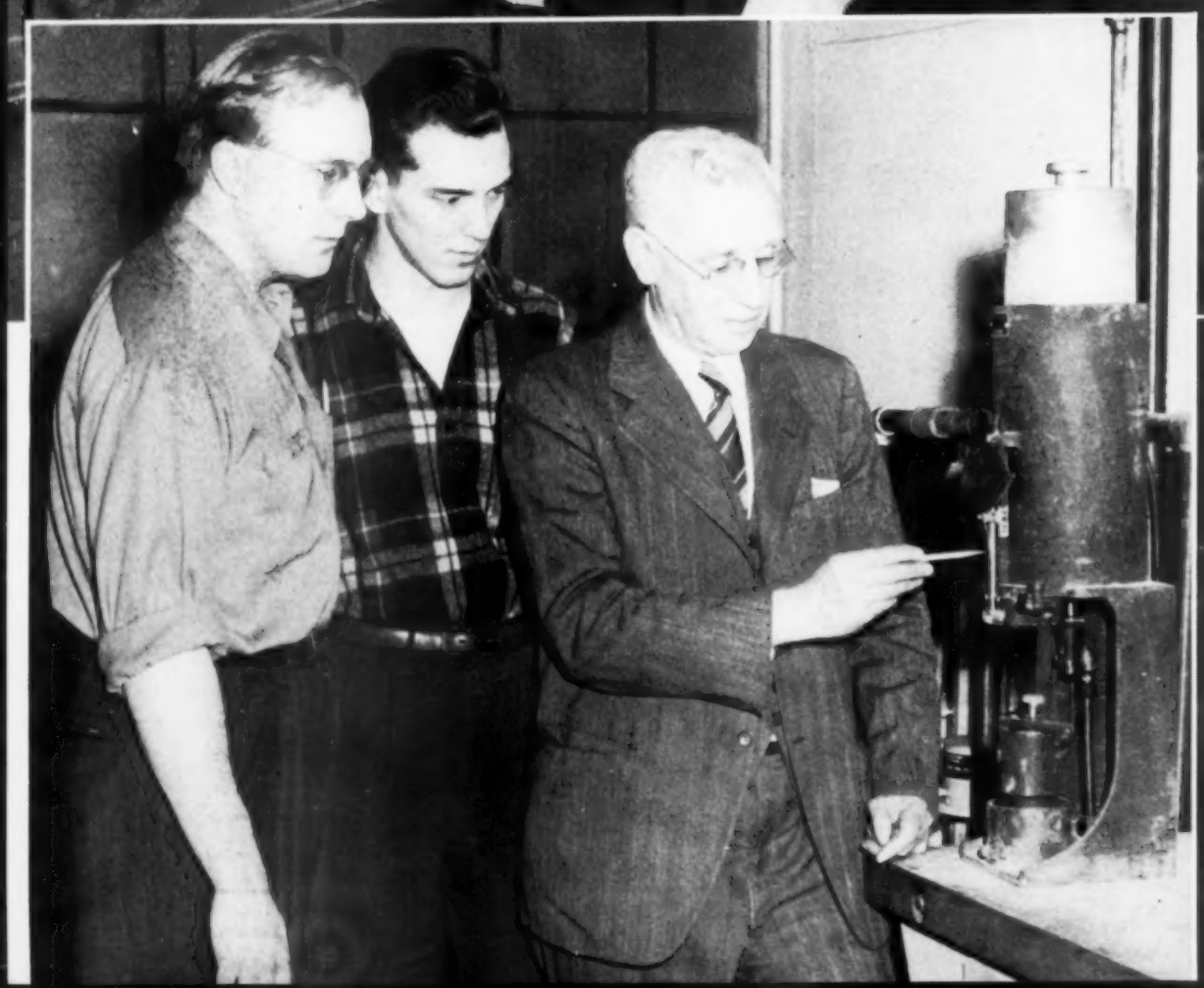
Fig. 16—Structure of white constituent in Compositions *D* and *E*. X1000; etchant alkaline sodium picrate

TABLE I—Average Wear Results of Liners Made of Various Compositions

Composition	T.C.	Si	Mn	P	S	Ni	Cu	Cr	Mo	No. Liners Tested	Avg. No. Hours	Wear In./ 1000 Hrs.
A	3.00–3.30	1.15–1.35	.90–1.10	.20 max	.12 max	...	.80–1.10	...	...	28	8340	.0057
B	3.40 max	1.50 max	.90 max	.35–.50	.13 max	...	...	...	...	19	20200	.0012
C	2.85–3.30	1.25–1.75	1.00 max	.20 max	.12 max	1.00–1.50	...	.30–.40	.25–.35	4	4500	.0009
D	2.80–3.10	4.6 –5.00	.80 max	.20 max	.12 max	...	...	1.90–2.20	...	6	27746	.00097
E	3.10–3.40	3.30–3.70	.80–1.00	.40 max	.12 max	...	...	1.20–1.50	...	30	19514	.00062
F	3.30–3.40	1.75–2.00	.90–1.10	.20 max	.12 max	...	...	...	.40–.50	3	8000	.0020
G	3.00–3.20	1.15–1.35	.90–1.10	.20 max	.12 max	...	...	...	...	2	67770	.00048
											(Hardened to 415 brinell)	

A NEW APPROACH TO Foundry Instruction

By ERLE F. ROSS
Chicago Editor
THE FOUNDRY



University of Illinois' Chicago Undergraduate Division aims to give its students a broader concept of the foundry industry than is to be derived from mere proficiency in patternmaking, molding, melting and pouring

A NEW approach to instruction in pattern design and foundry practice is being followed at the recently established Chicago Undergraduate Division, University of Illinois, housed on Navy Pier, Chicago. The aim is to give the student a broader concept of the foundry industry than is to be derived from mere proficiency in patternmaking, mold preparation and metal melting and pouring.

The engineering graduate entering industry is expected to find his place ultimately in supervisory, managerial or executive capacity; therefore, he needs broad knowledge of the various methods of metal fabrication. To that end, the Navy Pier Branch of the University of Illinois sets forth the aims and objectives of its foundry and pattern course as to give the student an understanding of:

1. The processes, materials and products of the foundry as an example of fabrication, producing engineering parts for use in industry.

2. The necessity and advantage to the engineer designer in knowing the effect of design on the properties of the part produced by this method of fabrication.

3. The need for and use of methods of engineering control in obtaining the best possible properties at the least cost in casting as one example of manufacturing.

4. The types of casting and their properties produced by ferrous and nonferrous classes of metallic alloys and their engineering fields of application.

Navy Pier Branch is now in its fourth full regular semester, having been established in the fall of 1946 when, after the end of World War II, the University of Illinois, Urbana, Ill., was forced to expand its operations and facilities to accommodate increased enrollment sought by war veterans. Chicago was selected as the location for the branch because of the large number of enrollees residing in that area. Therefore, the university leased from the city of Chicago that portion of Navy Pier which had been used by the Navy during the war for training purposes.

The space leased was already partially adapted to use for university purposes but considerable re-arrangement and alterations had to be undertaken to make the facilities fully adaptable. Then followed the acquisition and installation of equipment to outfit classrooms and laboratories.

The Navy Pier Branch operates two semesters and summer school each year. Its curriculum embraces engineering, commerce, and literature and arts, but for the first two years of college only. Total enrollment is 4500 students, of which about 500 are women. Enrollment in the engineering school is 1466. The foundry and pattern course is of sophomore rank and has enrolled in it approximately 200 students each semester, or 400 for the year. Last year the figure was 300.

At the beginning of the semester the students are divided into two groups, one to take the foundry laboratory and the other to take pattern design. At the end of the half semester the two groups are interchanged. These groups are divided into sections or classes of from 10 to 18 students each.

The foundry and pattern course instructional staff is comprised of Robert E. Kennedy, Roy W. Schroeder and Glenn E. Cramer, all well known in the foundry industry. Wayne A. Wright, formerly a member of the AFA national office staff in Chicago, serves as foundry mechanical assistant.

To Mr. Kennedy goes the credit for organizing and setting up the foundry and pattern course. He was given this assignment in (*Please turn to page* 176)

Top left — Glenn Cramer explains principles of pattern design

Far left — Bob Kennedy instructs two students in operation of sand permeability meter

Left center—Students are shown by Roy Schroeder how to remove horn gate from fluidity test mold

Left—Heat being poured from electric arc furnace at foundry of Navy Pier Branch, University of Illinois, Chicago

By FLOYD A. LEWIS
Technical Consultant
Aluminum Association

Aluminum Alloy

Factors to be considered in the design of aluminum alloy castings are discussed here. This is the sixth of a series of articles based on a survey sponsored by the Foundry Division of the Aluminum Association

BOTH functional requirements and foundry considerations influence the design of aluminum alloy castings to a significant degree. Proper consideration of these factors during the design stage will contribute heavily toward the production of high-quality castings on an economical basis.

In many respects the design of a casting for aluminum alloys is similar to that required for other metals. Special consideration, however, must be given to aluminum's unique characteristics and to its behavior in the foundry if satisfactory results are to be obtained. Close co-operation between the design engineer, the pattern or mold maker, the metallurgist and the foundryman also is necessary.

Choice of casting process is one of the first decisions to be made when a new casting is to be produced, because many features of the design will be influenced by the method of casting. In choosing between methods, the size and shape of the casting, minimum section thickness, dimensional tolerances and surface finish are the primary functional design factors to be considered; the number of pieces to be cast and relative machining and finishing costs are the primary economic factors in nearly all problems.

If the expected production is relatively small, sand casting probably will be the logical method to use. If the piece is intricate, sand casting also will probably be indicated although more and more intricate designs are being cast in permanent molds, especially through the use of sand cores (semipermanent mold process). Throughout this article general comments on the permanent mold process apply also to the semipermanent mold method, since the only difference is in the use of metal cores in the former and sand cores in the latter.

Because of the greater chill produced by the metal mold, permanent mold castings have a finer grain structure than sand castings and consequently higher mechanical properties. Greater uniformity in permanent mold castings also means that a lower factor of safety may be permissible in the design. By taking full advantage of these factors, castings made by the permanent mold process will require less metal for the same design stress than sand castings. The smoother surfaces and closer dimensional tolerances of permanent mold castings mean lower machining

Fig. 1—Cast aluminum matchplate used in production of aluminum castings
Fig. 2—Cope and drag patterns for aluminum casting production
Fig. 3—Gated pattern of cast aluminum

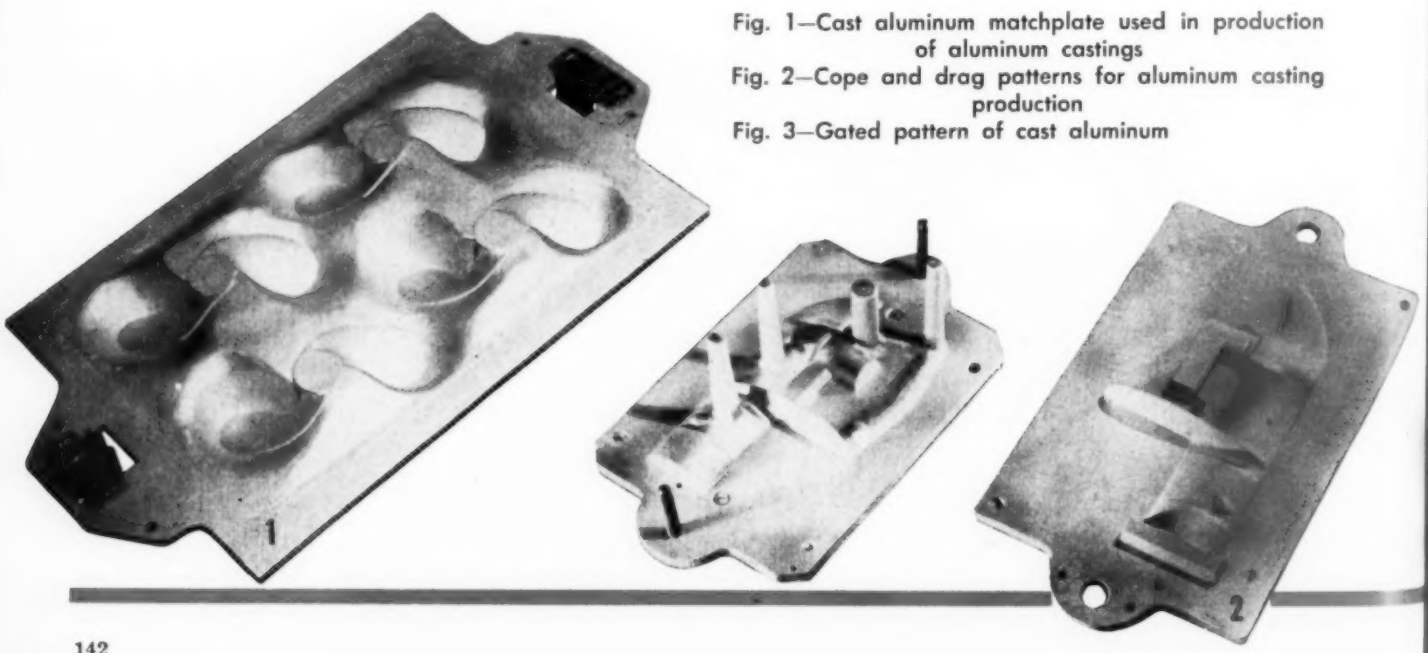
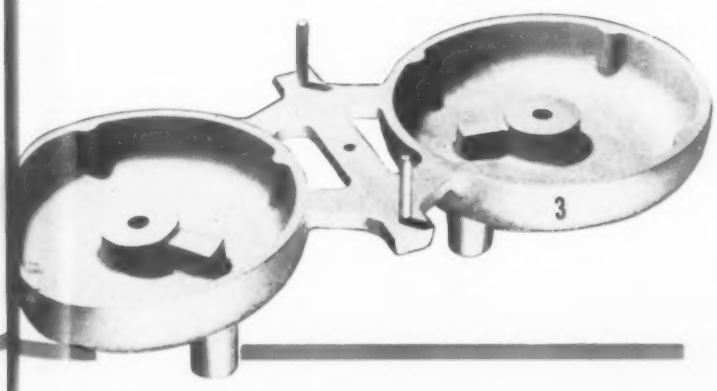


Fig. 4—Diesel engine crankcase

and finishing costs. These advantages offset to some extent the higher initial cost of the metal mold, as compared with sand-casting pattern equipment.[1]

Choice of alloy also is one of the first determinations to be made in the design of a new casting. Mechanical and physical characteristics of the principal commercial aluminum alloys were covered in detail in the first two articles of this series. Although tensile strength is perhaps the most significant single characteristic to be considered, an alloy should not be chosen on the basis of that property alone. Yield strength, elongation, resistance to corrosion, and mechanical properties at elevated temperatures are other characteristics that may be significant in any particular application. Other properties may be important in other cases.

In applying those characteristics to an actual design, it must be borne in mind that the mechanical characteristics given in the tables in the second article are based upon tests made on carefully cast test bars. In some castings these characteristics may not be fully realized. For example, in castings involving thick sections where the rate of solidification is relatively slow, the unit mechanical strength may be lower than that shown by the test bars. Likewise in castings having thinner sections the unit mechanical strength may be higher than in the separately cast test bars.



For the same reasons, test bars machined from different parts of the same casting may show different mechanical properties, depending on the location from which they were taken. Section thickness, gating and risering, chilling, pouring temperature, moisture content and permeability of the sand, and any other factors influencing the solidification rate of the metal will affect the mechanical properties of the casting.

Selection of an alloy for any given casting thus involves (1) consideration of foundry characteristics and physical properties and (2) determination of the proper factor to be applied to the specified mechanical properties in calculating the design stress. In determining this factor the class of service for which the casting is intended must be taken into consideration as well as variations in the properties of different sections. There are no hard and fast rules by which such factors can be determined and applied; here again good judgment based on sound experience is the best guide.

After the casting method and alloy have been

chosen, the full details of design must be considered. Both foundry considerations and service factors must be carefully evaluated. The most important of these factors are discussed in the following paragraphs.

Section Thickness — Wherever possible, section thickness should be uniform throughout, especially in permanent mold castings. Uniform section thickness simplifies gating and feeding and minimizes the danger of solidification shrinkage and cracking caused by the unequal solidification rates of adjacent sections of differing thickness.

Where strength is needed, sections may be stiffened by reinforcing ribs of the same thickness. Large flat areas are difficult to feed properly, particularly if thin, and are likely to become warped during removal from the mold or in subsequent handling. Slightly curved or ribbed construction will minimize these difficulties.

Where sections of different thickness in the same casting cannot be avoided, the thickness should be increased gradually, or blended, where the sections of different thickness adjoin. A design in which a heavy section is isolated by two lighter ones should be avoided unless the heavy section is on a parting line.

Minimum section thickness in aluminum castings is generally considered to be ⅛-in., although 3/16-in. or thicker sections are required for the majority of castings, depending on the size and shape. Under special conditions, castings having sections thinner than ⅛-in. can be produced in permanent molds, depending on the alloy and on the size, intricacy and pressure requirements of the casting.

A factor to be borne in mind in connection with minimum section thickness is that for a given alloy the pouring temperature is governed by the thinnest section and its gating. The pouring temperature in turn has a significant influence on the physical properties of the cast metal. The low specific gravity of aluminum also has a bearing on the size of section that can be satisfactorily cast in any given thickness without misruns or cold shuts. Best results require a compromise between these somewhat conflicting factors.

Ribs and Fillets—The same factors which influence section thickness also largely determine the design of reinforcing ribs. Thin ribs impose casting difficulties, as the higher rate of solidification sets up strains. Special care must be exercised also to attain the best stress distribution in the edges of the ribs.

Ribs should have flat rather than rounded outer edges, to avoid overstressing the outer layers. It is desirable also to add beads to the outer edges wherever this can be done without unduly complicating the molding operation. Whenever possible, the casting should be designed so that the ribs are cast in the drag, as they are less likely to contain imperfections than if cast in the cope.

Generous fillets should be provided between ribs and their supporting sections, as well as between adjoining sections themselves. This will aid flow of the molten metal during pouring and in feeding adjacent portions of the mold. Generous filleting also helps to prevent excessive shrinkage and cracking as well as providing a more even distribution of service loads. Although some alloys (notably aluminum-silicon alloys which have excellent fluidity) can be cast with minimum fillets without cracking, sharp fillets in general should be avoided.

Locating Points—Locating points for guiding the machine shop in machining the casting should be so specified with respect to the outside walls of the casting that they will not be affected by core shifts. They should be clearly indicated on the pattern drawing so that both shop and foundry will check from the same points and to aid in placing gates, risers and chills. Center lines may be scratched on the patterns deeply enough to show on the castings, except in highly stressed sections where the stress-raising characteristics of the grooves would be objectionable.

Special care is required in specifying the locating points for castings to be made in permanent molds. Frequently the required gates and risers will not permit the location points to be placed as desired. This can best be determined by consultation with an experienced permanent mold casting engineer.

Draft and Shrinkage—Regardless of the method of molding or pattern equipment used, both draft and shrinkage must be taken into account in the design. In sand casting, sufficient draft, or taper, must be provided on all vertical faces to permit the pattern to be drawn from the mold. Proper molding requires at least 1/16-in. per foot (0.5 per cent), and drawings should indicate whether this is to be added to or subtracted from the casting dimensions.

In permanent molds, sufficient draft must be pro-

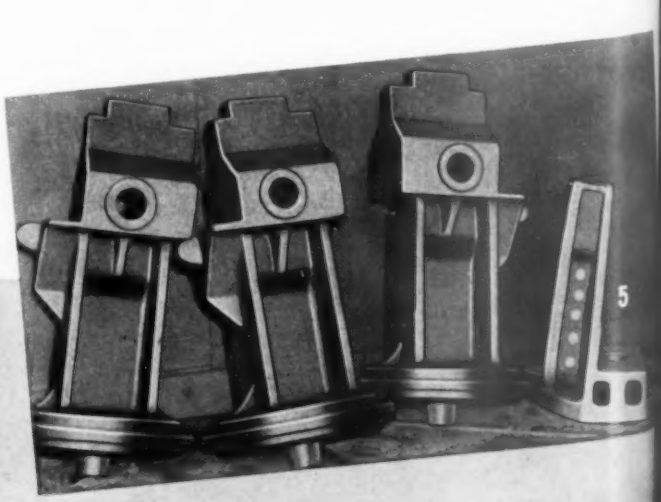


Fig. 5—Cast aluminum parts for beaching gear used on large flying boat

Fig. 6—Illustrating variety of size and type of sand cast aluminum castings

vided on vertical surfaces to permit the casting to be removed from the mold. This will vary throughout the mold cavity, depending on the orientation of the particular face with respect to the body of the casting. When molten metal solidifies it has a tendency to shrink away from the outer surfaces of the mold cavity and to shrink tightly around the inner surfaces. Thus more draft is required on the inner than on the outer surfaces. On outer surfaces a draft angle of 2 degrees on each side is usually considered minimum; on some parts draft angles of 3 degrees are necessary, while in special cases angles as small as 1 degree may be permissible. In inner surfaces draft angles should be 2 degrees minimum, 5 degrees desirable.

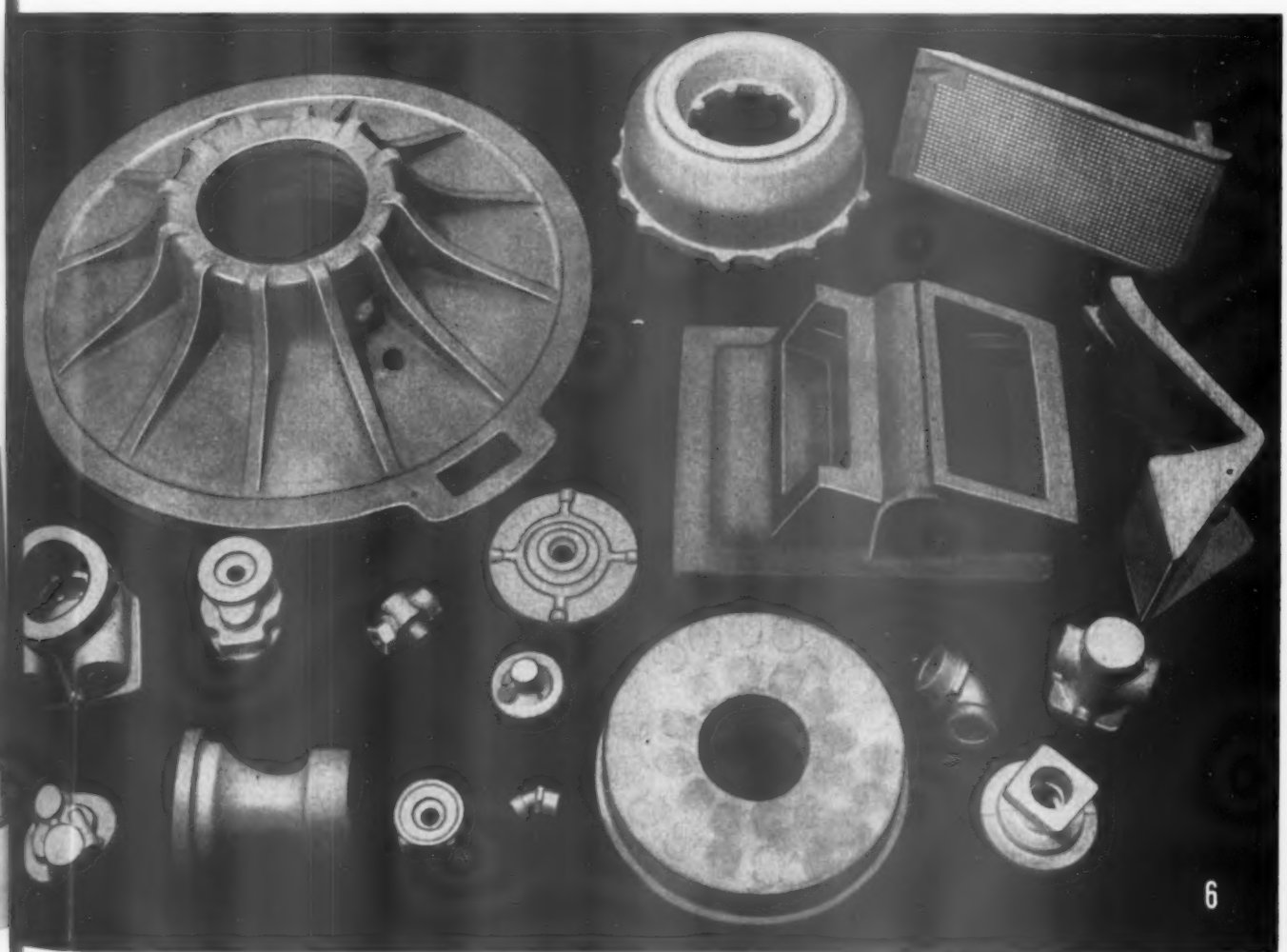
To compensate for the linear shrinkage resulting from the contraction of the molten metal upon solidification and cooling to room temperature, the pattern must be larger than the desired casting. For aluminum alloys this shrinkage may be as high as 5/32-in. per linear foot, but, because of variations in casting design, alloy and resistance to contraction offered by parts of the mold or cores, shrinkage may be as low as 1/10-in. per linear foot.

Because of the greater restriction that the metal molds offer to contraction, permanent mold castings require less shrinkage allowance than sand castings. The actual allowance in either case for any given casting must be determined by experience.

Machining Allowance—Finish allowances necessary on different parts of a casting vary, depending on the casting process, size of the casting, method of machining, and type of finish. For sand casting, simply rapping the pattern during molding will often provide sufficient allowance where only grinding or filing is required. For small and medium sized castings to be finished in a lathe, planer, or milling machine, $\frac{1}{8}$-in. usually is sufficient; $\frac{1}{4}$-in. or more is required on large sand castings. Wherever possible, surfaces to be machined should be cast in the drag, because imperfections are less likely to occur in that part of the mold. If such surfaces must be cast in the cope, additional finish allowance is necessary for any imperfections to be machined off.

In permanent mold casting less finish allowance is necessary, because of the smoother finish and greater uniformity of dimensions obtained with that method. Surfaces that would be machined if the part were sand cast should also be machined when cast in permanent molds, but usually allowances of from 1/32 to 1/16-in. are sufficient for small and medium sized castings; up to $\frac{1}{8}$-in. may be required on large permanent mold castings.

Molding and Coring—From the standpoint of economy, it is desirable to design sand castings so that both molds and cores can be made of green sand rather than dry sand. As green sand does not have the strength of dry sand, (*Please turn to page* 352)



Questions AND Answers

Alloy Needs Special Practice

Q.—We will appreciate any information you can give us on the No. 220 aluminum alloy containing 10 per cent Mg which requires special foundry practice. Are there any books containing such information? We use coke as fuel, cover on crucible and try to pull pot as close to pouring temperature as possible. Also we flux only the top or head of the metal. We have tried not using flux and various tactics, but to no avail.

A.—As you mention, the 10 per cent Mg-90 per cent Al alloy does require somewhat different practices than the regular aluminum alloys. Due to the high magnesium content it is necessary to employ special fluxes composed of the halides of alkaline earths and metals, and inhibitors should be used in the molding sand to prevent reaction between Mg and H_2O. Inhibitor in sand may be around 2 per cent boric acid and 1 per cent diethylene glycol, or boric acid with ammonium bifluoride or silicofluoride. Naturally the moisture content of the sand should be held as low as possible.

Since the alloy has high shrinkage characteristics large risers should be employed, and chills used to hasten cooling at the heavier sections. Sand preferably should be of high permeability. Practice with the 10 per cent Mg alloy is to heat to 1470 to 1560° F in the furnace, pull the pot and allow to cool to 1290 to 1330° F for pouring. That is done to obtain a good grain size.

Pour Castings in Open Molds

Q.—We have an order for cast iron counterweights 2 ft 8 in., square, a number 6 in., thick and the remainder 3 in., thick. We expect to make the molds in green sand. We have a Jersey sand, satisfactory for most work, but inclined to pull down on heavy jobs. We shall appreciate your advice on molding, gating and risering.

A.—You should not anticipate any trouble with casting the counterweights in green sand. In foundries catering to steel plants, ingot mold stools which approximate your castings in size, weight and thickness are cast regularly in green sand. The bottom of the mold should be well vented, with a coke bed if the pattern is bedded in the floor, or with crisscross shallow channels in the underneath side of the drag if the mold is made in a drag and rolled over. If this precaution is not observed, steam will bubble up through the casting and bring up more or less sand from the mold face.

Several varieties of Jersey sand are quite satisfactory for this job. However, a local sand, which you probably use as a general purpose sand, will serve your purpose in this instance. Facing is half and half new and old sand, with sea coal 1 to 8. The main feature is to fill the mold as quickly as possible, to bring the metal up against the cope face before the sand begins to crumble or spall or yield in any other manner.

It does not matter whether the casting is gated at one side, or through several small pop gates on the top. If gated at the side, it is advisable to have a gate with two branches fed by a runner and a single sprue. Each branch is 1-in. thick and extends on a slant to the bottom of the mold. A piece of dry sand slab core on the drag face in front of each gate will prevent cutting or scabbing in that area.

Ordinarily the casting should not need any riser, except a small pop sprue to show when the mold is full. However, if the casting shows a tendency to sink over the top face, a 6-in. riser can be erected over the center. The riser is connected to the casting through a 2-in. hole or neck in a thin, flat core.

If you can come to an understanding with the inspector on the job, you can cast the weights in open sand molds. For the purpose they are intended, they will be just as satisfactory as castings machined on both faces.

Wants Coating for Metal Mold

Q.—We cast bronze bars ranging from 3 to 8 in. OD and 15 in. long in iron molds in our foundry. We have experimented with coating the molds with aluminum paint and with graphite in oil. We had decided definitely on aluminum paint, but some scrap trouble was attributed to that material, so we turned to the graphite in oil coating. However, that has created in addition to bad working conditions, a fire hazard as our molds are hooded for forced draft ventilation. In spite of being careful we have had several fires due to the oil-type mold wash. We would like suggestions as to various types of mold washes which we could test.

A.—Your reference to having fires with the graphite in oil coating indicates that probably too heavy a coating is being applied. Only a thin film is necessary. Possibly the trouble may be due to the type of oil being used, and it might be worth while to consult with an oil producer for recommendations. However, with oil you will have smoke, but the amount can be controlled to some extent by proper application of oil.

You do not mention what type of scrap trouble was attributed to aluminum paint, but Pell-Walpole, the eminent British metallurgist who developed the use of aluminum powder as a mold coating, points out that a minimum of 5 per cent aluminum powder is required to prevent gassing, but that high concentrations cause some entrapping of aluminum in the cast-

ing. On metal cores protected by a wrapping of asbestos paper he used a coating composed of 5 per cent aluminum powder, 2 per cent dextrine and water. Core was dried at 300°C. For coating the metal molds a resinous aluminum paint was used, only a thin film being applied.

As far as other materials to test you might try any of the numerous proprietary materials offered in the advertising pages of THE FOUNDRY. You also might try various refractory clays suspended in water by the use of small amounts of sodium silicate (water glass). As mentioned previously, only a thin coat should be applied. Usually the best procedure is to apply the wash to the mold when it is fairly warm, but not so much so that the coating boils, leaving small holes in the surface. Additionally, after the coating is dry it could be smoked with an acetylene torch. By such procedure it may be necessary to apply only one clay coating—the smoking being done each time before the mold is used.

Can Use Cope and Drag Flasks

Q.—We operate a small foundry and have an order for several hundred water buckets or drinking pots for installation in dairy barns. These are made of cast iron and weigh 30 lb, and are in the form of a truncated cone, 12 in. diam at the mouth, 10 in. high with a flat section on one side for mounting on the wall. These now are made in a three-part mold, and our capacity is eight per 10-hr day. Can they be made on a machine, and what kind of a machine would be required?

A.—In making the water bucket, it appears to us that you are doing a lot of extra work in using a three-part mold. We believe that it can be made in two-part mold by changing the gating system so that pouring is through the riser. If the sand beneath the riser tends to cut or wash you can use a dry sand core at that point. You do not mention any trouble with blowing so presumably your sand is sufficiently open. One point where difficulty sometimes occurs is in the high mound of sand on the drag which forms the interior of the bucket. That should be vented to the outside, and see that the bottom board is not too tight.

The water buckets could be made on a jolt-rollover molding machine as a two-part mold or, if you desired, the three-part mold also could be produced.

Production of Malleable Iron

Q.—We are operating a small malleable iron foundry in Mexico, and due to difficulty in obtaining coke have decided to construct a rotary furnace fired with fuel oil and using a recuperator. Can you tell us the best chemical analysis for blackheart malleable and the annealing cycle? Our present analysis shows 2.80 to 3.0 per cent C, 0.90 to 1.25 per cent Si and 0.385 per cent Mn. Annealing furnace is oil fired with automatic, pyrometric control, and castings are packed in silica sand and iron ore. Present annealing cycle is 24 hr to bring up to 920°C where it is held for 48 hr. Then temperature is dropped at the rate of 10°C per hr to 800°C, followed by a decrease in rate to 3°C per hr down to 650°C where it is held for 3 hr. Cooling then proceeds at the rate of 10°C per hr to 550°C when the furnace is unloaded. We would like to cut the time in half.

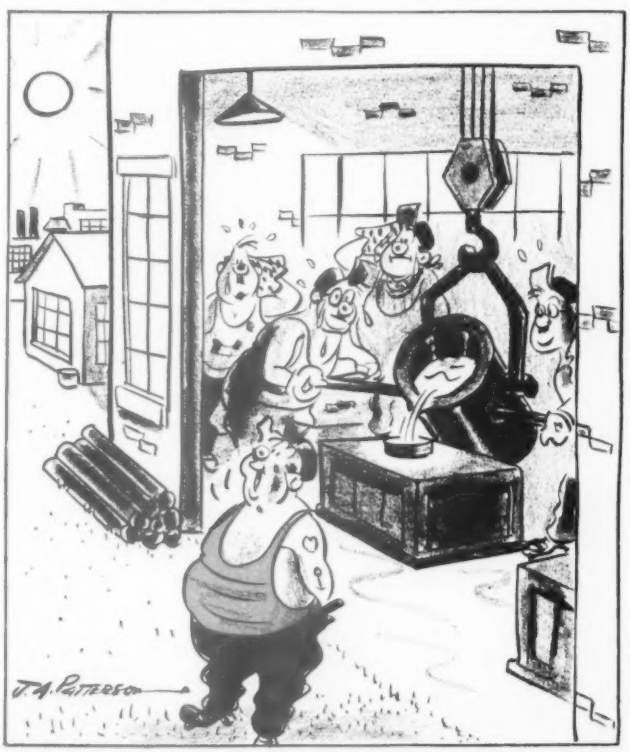
A.—Your question on malleable iron is rather difficult to answer since it appears that you are making a material which is somewhat between American blackheart and European whiteheart. Cupola malleable as made in this country mainly for pipe fittings contains 2.80 to 3.10 per cent C, after annealing has the following approximate composition range—C 2.50 to 3.00 per cent; Si 0.70 to 1.10 per cent; Mn 0.40 to 0.60 per cent; P under 0.20 per cent, and S 0.15 to 0.25 per cent. Usually the molten iron is treated with fused soda ash to hold the sulphur to the minimum value. Tensile strength ranges from 43,000 to 49,000 psi; yield point from 31,000 to 41,000 psi and elongation in 2 in. from 6.5 to 8.1 per cent.

While we believe it is possible for you to reduce your annealing cycle to some extent, we doubt that you can approach the time you have in mind without some change in equipment, and experimental work on composition and control. One way that some time could be saved is by the elimination of packing material. Pots and packing material cause a lag of 8 to 20 hr between temperature in the furnace and that of the castings. You probably cannot eliminate use of pots very well without substituting a controlled atmosphere within the furnace. However, you could eliminate the packing material, and we understand that pipe fittings are annealed in tightly sealed pots without any packing material.

With your present cycle you can reduce the time by rapid cooling between 920° C and 800° C, and from 650° C. In fact, you may produce better iron by cooling rapidly from 650° C. Two annealing cycles operating successfully with cupola malleable pipe fittings in oil-fired 55-60 ton furnaces are given

GANGWAY!

By J. A. PATTERSON



"Boy—that ole sun feels good!"

as follows: Heat to 1750° F in 16 hr; hold at 1750° F for 24 hr; cool to 1100° F in 60 hr and remove furnace door. Heat to 1600° F in 16 hr; hold at 1600° F for 30 hr; cool to 1100° F in 60 hr and remove furnace door. It might be well worth your while to explore your annealing cycle by placing thermocouples in pots located in various positions in the oven and observe the relationship between oven temperature and casting temperature, and from that develop a minimum annealing cycle which will produce a product with the desired characteristics.

Metal Does Not Rest Quietly

Q.—We are sending for your examination a piece from a bathtub which contains a defect which occurs at times. Casting is made under a sandslinger using Albany sand with an AFA grain fineness number 100, bond 9 to 11 per cent, permeability 42, green compression strength 7.0 psi, moisture 5.5 per cent. Iron contains 3.40 per cent TC, 2.70 per cent Si, 0.090 per cent S, and 0.70 per cent P. Pouring temperature is about 2520° F.

A.—In our opinion the defect indicated in the piece of iron submitted for examination is due to some condition which prevented the molten iron from lying quietly on the sand. From your description the defect is localized and, since it appears occasionally, may be due to the presence of a sand or clay ball just sufficiently high in moisture content to cause agitation fluttering of the molten metal. Again it might be caused by a piece of tramp iron in the sand, or possibly the presence of a piece of wood or other organic material exposed to the action of the metal.

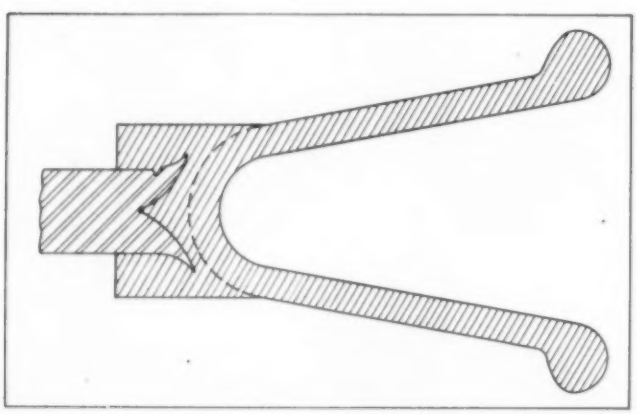
Spokes Loosen in Large Wheel

Q.—We shall appreciate your opinion in casting a wheel, cast iron rim and hub, connected by a set of steel spokes ⅞-in. diam with cone shape ends. Rim is poured at one heat, and hub on the following day. One set of spokes is loose at the rim connection. Apparently the cast iron did not weld to them. Ends were ground clean and covered with machine oil before they were placed in the mold. We have been told that we should have covered the ends with water glass.

A.—Water glass, the common name for sodium silicate, may be and frequently is used for coating the ends of steel spokes in wheels where the rim and hub are cast iron. This is not because the water glass in itself has any miraculous property for promoting the fusion of the iron and the ends of the spokes. Water glass is used for the same purpose as any one of several materials whose sole mission is to prevent the formation of oxide on the surface of the spoke ends.

Incidentally, the coating also prevents any possible condensation of moisture on the spoke ends between the time they are placed in the mold and the time when they are surrounded with molten iron. Other materials used for the same purpose include oil of any kind, red lead paint, pitch, tar, shellac, or chalk. The red lead paint probably is first choice, not because it is metallurgically any better than the others, but because it is quite satisfactory, and is cheap.

The iron must be poured hot to get any kind of a grip on the spoke ends. Even with hot iron a perfect weld is not effected. The cold spoke end acts as an internal chill and cools the surrounding iron to a temperature below that necessary for welding. Foundrymen engaged in the production of steel spoke wheels, depend on mechanical rather than on metallurgical junction. On small wheels the ends of the spokes are upset. On large wheels the ends of the spokes are nicked. The end of each spoke also is split and the split parts are spread outward.



End of steel spoke is nicked and split in typical wheel, not drawn to scale

Defect Arises from Wet Ladle

Q.—We are forwarding for your inspection a small gray iron casting in which the partly machined area discloses great numbers of small blow holes singly or in clusters. We shall appreciate your opinion on the cause and remedy for this condition.

A.—This fairly common form of defect may be traced to any one or a combination of causes, of which a wet ladle is the most prevalent. Other items responsible for the condition include wet, hard sand, or sand of low permeability; wet cupola bottom or spout; pieces of wood or other combustible material in the sand; occasionally a combination of low bed and high blast in the cupola. In the first several items cited the direct cause of the defect is steam generated by the hot metal in contact with the sand. In some instances the moisture is on the face of the mold and results from the use of hot sand on cold patterns, or cold sand on hot patterns.

Where the mold stands for several hours before it is filled with metal, some of the moisture condenses on the surface where it immediately is converted into steam. The steam, in forcing its way up through the metal, breaks up into small bubbles encased in a thin metal sheath. In the second set of conditions, a mild bessemerizing effect takes place with a low bed and a high blast in the cupola. The iron is oxidized, or impregnated with gas which remains in the casting. Sometimes the holes are visible on the surface, but in the majority of instances they are not disclosed until the casting is partly machined. By a careful process of elimination you can arrive at the exact cause of the trouble. Based on long experience we are inclined to the opinion that you will find that a partly dried ladle lining is responsible.

NISILOY*

. . . A POWERFUL, POSITIVE INOCULANT

CUTS FINAL COST OF GRAY IRON CASTINGS

BENEFITS TO CASTING USERS

EXCELLENT MACHINING QUALITIES — The dense, gray, machinable structure secured with Nisiloy reduces machining time, tool wear, rejects and costs.

INCREASED WEAR-RESISTANCE — The formation and distribution of finely divided random flake graphite accomplished with Nisiloy assures highly improved resistance to wear.

IMPROVED TOUGHNESS—Nisiloy acts to eliminate hard, chilled areas in thin and thick sections alike . . . thus, the casting is thoroughly machinable yet less sensitive to breakage in machining operations and general service.

DEPENDABLE PRESSURE-TIGHTNESS — The sound, homogeneous structure attained by inoculating with Nisiloy results in dense cast iron that provides substantially improved pressure-tightness.

BENEFITS TO FOUNDRYMEN

REDUCES REJECTS—Used for structure control of cast iron, Nisiloy helps your foundry meet daily schedules for uniform lots of machinable gray iron castings.

PROMOTES SOUND CASTINGS — Diffusing rapidly throughout the melt, Nisiloy promotes a dense, close-grained product.

CURBS BREAKAGE — Even where section thickness varies sharply, Nisiloy serves to eliminate chilled edges and surfaces, thus affording a tougher cast iron that resists breakage in shop handling.

NO SCRAP PROBLEM—Containing only elements that dissolve freely in iron, Nisiloy permits remelting sprues and gates in any successive melt without risk of adding chill-forming elements.

FEWER BASE MIXTURES—Often a single base mixture may be used in the cupola to which Nisiloy is added in the ladle, with the consequent flexibility of pouring off thin or thick sectioned castings as desired.

Use the coupon below for full information about one of the most useful products ever offered for improving machinability and structure of gray iron castings. Nisiloy contains 60 per cent nickel, 30 per cent silicon, balance essentially iron. Fill in and mail the coupon now.

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TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.
Dept. **TF**, 67 Wall Street, New York 5, N. Y.

Please send me your booklet entitled,
"NISILOY" for GRAY IRON CASTINGS

Name.....*Title*.....

Company.....

Address.....

City.....*State*.....

*Trade Mark of The International Nickel Company, Inc.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Men OF INDUSTRY

RECENT additions to the staff of Stainless Foundry & Engineering Co., Milwaukee, are **Dan Lucas,** superintendent; **David N. Carlson,** sales engineer; **Marvin Kreuter,** maintenance foreman, and **Walter Bessell,** inspection foreman. Mr. Lucas was graduated from the University of Wisconsin, Madison, Wis., and two years later joined General Foundry Co., Milwaukee, where he served 15 years, the last nine as superintendent. He then became superintendent of Slinger Foundry Co., Slinger, Wis., and after two years assumed his present position. Mr. Carlson was graduated from the University of Wisconsin in 1916 with a professional degree in chemical engineering and for 21 years was associated with L. J. Mueller Furnace Co., Milwaukee. During World War II he was superintendent of the explosives division, Milwaukee Ordnance Plant. In 1943 he joined Signal Battery Co., Milwaukee, as technical manager, and recently accepted his present position.

Walter Bessell attended Wisconsin Institute of Technology, Plattville, Wis., from 1939 until 1942 when he was called to serve in the armed forces as flight chief, Army Air Corps. Upon discharge he returned to Wisconsin Institute for a short time, and then attended Wisconsin School of Mines where he was graduated with a B.S. in metallurgy in 1947. Marvin Kreuter attended Marquette University, Milwaukee, from 1940 to 1943 when he was called into the armed froces, serving as pilot instructor in the Army Air Corps. After his discharge from the army he returned to Marquette where he was graduated with a B.S. in mechanical engineering.

♦ ♦ ♦

D. F. Kane has been appointed manager of the Dunkirk, N. Y., plant of United States Radiator Corp., Detroit. Mr. Kane became associated with the company 33 years ago as an office clerk. He served as office manager of the Dunkirk plant for 30 years, until his appointment as acting manager there six months ago.

♦ ♦ ♦

Werner Finster, recently elected president of the Reading Foundrymen's Association, is chief metallurgist of the Reading (Pa.) Steel Casting Division and the Reading-Pratt & Cady Division, American Chain & Cable Co., Bridgeport, Conn. Mr. Finster was born in Germany and was graduated in metallurgical engineering from the Bergaakademie, Freiberg. He was research chemist for the Carus Chemical Co., La Salle, Ill., from 1927-28 and from 1928-30 was in the research and testing laboratory of Deere & Co., Moline, Ill., and foundry metallurgist, John Deere Tractor Works, Waterloo, Iowa. He became associated with the American Chain & Cable Co. Inc., at Reading, in 1930. Active on AFA committees, he served as chairman of its subcommittee on Physical Properties of Steel Foundry Sands at Elevated Temperatures for 2 years, and was treasurer of the Reading Foundrymen's Association last year. Mr. Finster is also a member of the American Society for Metals.

♦ ♦ ♦

W. W. Flagle has been appointed manager of the Indianapolis plant of National Malleable & Steel Castings Co., Cleveland. Mr. Flagle, associated with the company for 30 years, has been general superintendent of its Sharon, Pa., plant for the last 4 years. **Raymond S. Davis,** who has been manager at Indianapolis for 4½ years, will continue in an engineering capacity. **B. E. Gavin,** who has been general superintendent there, has been named assistant manager.

♦ ♦ ♦

H. H. Holland has been appointed works manager of the Radford, Va., plant, Lynchburg Foundry Co. Inc., Lynchburg, Va., succeeding **R. S. Dower,** who has retired due to ill health. Mr. Holland has been associated with the company for the last 10 years and formerly served as plant manager and acting manager at the Radford Works.

♦ ♦ ♦

Charles H. Cousineau has resigned as foundry metallurgist, West Michigan Steel Foundry Co., Muskegon, Mich., to join the Hill & Griffith Co., Cincinnati. Mr. Cousineau is chairman of the Western Michigan Chapter of the AFA.

♦ ♦ ♦

Dr. John A. Hutcheson has been appointed director of the Westinghouse Electric Corp. Research Laboratories, Pittsburgh, to succeed **Dr. L. Warrington Chubb,** who has retired for reasons of health, following 40 years of service. Dr. Hutcheson was

(*Continued on page* 152)

DAN LUCAS

DAVID N. CARLSON

D. F. KANE

WERNER FINSTER

GREETINGS

to our Good Friends of the Foundry Industry

WE look forward to the pleasure of meeting with you once again at the 52nd Annual Convention, which promises to be of outstanding interest to all who sell and serve the foundry industry.

WOODWARD IRON COMPANY

Independent Since 1883

WOODWARD, ALABAMA

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(*Continued from page* 150)

graduated from University of North Dakota and joined the company in 1926 as an electrical engineer. In 1940 he was named manager of the electronics engineering department at the Baltimore plant and has been associate director of the laboratories since 1943. Dr. Chubb, a graduate of Ohio State University, joined the Research Division of the company in 1907, and has been director of the laboratories since 1930. He will continue to serve in an advisory capacity.

♦ ♦ ♦

George R. Gardner, Harold Y. Hunsicker and **Walter E. Sicha** have been appointed assistant chiefs of the Cleveland branch of Aluminum Research Laboratories, Aluminum Co. of America. Mr. Gardner, a graduate of Antioch College, joined the Cleveland plant of the Aluminum company in 1939 as plant technician. During the war he traveled as a specialist on aluminum cylinder head casting technique and in 1944 became a member of the Research Laboratories. Mr. Hunsicker, upon graduation from Purdue University, entered the Cleveland Metallographic Laboratory of the company. Two years later he took charge of the bearing alloy development program and in 1945, permanent mold research was added to his duties. Mr. Hunsicker was chairman of the Cleveland Chapter of the American Society for Metals last year. Mr. Sicha, a graduate of Case Institute of Technology, took his master's degree in metallurgical study and research from University of Michigan in 1929, when he entered the general technical department of the company at Cleveland. In 1941 he became superintendent of its magnesium sand foundry at Bridgeport, Conn., and in 1943 was appointed a member of the Research Division, in charge of sand casting research.

John A. Sauer, president of Symington-Gould Corp., Rochester, N. Y., has resigned. Mr. Sauer joined the T. H. Symington Co., Baltimore, in 1907, as an office boy, and subsequently went to the New York office, attending evening classes at New York University School of Commerce. In 1917 he became secretary of Symington-Anderson Co., Rochester, returned to New York in 1919 as assistant to the vice president and later became assistant to the president. In 1924 he was elected vice president of the Symington Co., successor to the T. H. Symington Co., and held the same office with Gould Coupler Co., which was acquired in 1925. When the two companies merged in 1936 he was appointed executive vice president and was elected president in 1944.

♦ ♦ ♦

Roger W. Batchelder has been appointed assistant to the president of the National Bearing Division, American Brake Shoe Co., New York, with headquarters in St. Louis. Mr. Batchelder attended Yale University and became associated with the company in 1933. **William H. Old,** formerly assistant general purchasing agent, succeeds Mr. Batchelder as general purchasing agent. Mr. Old was graduated from Virginia Military Institute and attended Harvard Graduate School of Business Administration, joining the company in 1940. He will continue to be located in New York.

♦ ♦ ♦

Jack K. Bybee has been appointed district manager of the Detroit sales territory, Ampco Metal Inc., Milwaukee, where he will be assisted by **Don Coleman**, field engineer. **Gordon E. Brown** has been named district manager of the Chicago sales territory, with **Robert H. Louthain,** field engineer. **Thomas Coghill,** until recently field engineer there, has been appointed development engineer in the application of copper-base alloys in process industries. **Wayne Camp** and **Donald Bennet,** with Industrial Instrument Co., Millburry, O., recently appointed distributor for Ampco in the Toledo territory, will handle application of aluminum bronze and other products in that area.

♦ ♦ ♦

H. M. Rishel, works manager, Indiana Harbor Works, American Steel Foundries, East Chicago, Ind., resigned March 29 because of ill heath and has been succeeded by **R. T. Leisk,** formerly assisant works manager of the company's East St Louis, Ill., works. Mr. Rishel had been associated with the company 30 years. In 1942, he was transferred from the post of works manager of the Granite City, Ill., works to similar post at the Cast Armor Plant which the company operated for the government during the war. After the war, he was made manager of the Indiana Harbor Works. Mr. Leisk has been associated with the company more than 25 years.

♦ ♦ ♦

Louis X. Ely has retired as general manager of Monessen Foundry Division, Monessen, Pa., and will continue as consultant. Mr. Ely owned Monessen Foundry & Machine Co. before it became a division of Rockwell Mfg. Co., Pittsburgh. **C. H. Dougherty,** formerly assistant manager, succeeds Mr. Ely as general manager.

♦ ♦ ♦

Harry J. Sprecken, supervisor of automotive foundries, International Harvester Co., Chicago, has retired. Mr. Sprecken joined the company in 1922 as superintendent of the gray iron foundry at the Tractor Works in Chicago. He has been supervisor of automotive foundries since 1930, dur-

(*Continued on page* 156)

HAROLD Y. HUNSICKER

WALTER E. SICHA

GEORGE R. GARDNER

Or from castings to ball races, billets to bits — whatever your grinding wheel problem is—a U.S. Royalite Wheel can handle it.

U. S. Rubber technicians can precisely engineer each wheel to your specifications. And whenever your operating conditions change, very often these specialists can *quickly* fill specifications never before demanded in a grinding wheel.

Research and experience are the backbone of U. S. Rubber success . . . research that covers not only bonds and abrasives, but also related fields served by the products of U. S. Rubber. This has been going on for over 85 years.

Moreover, your actual operating costs can be told in *advance*, by means of tests right in your own plant.

For complete information, write to Mechanical Goods Division, United States Rubber Company, Fort Wayne, Indiana.

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SERVING THROUGH SCIENCE

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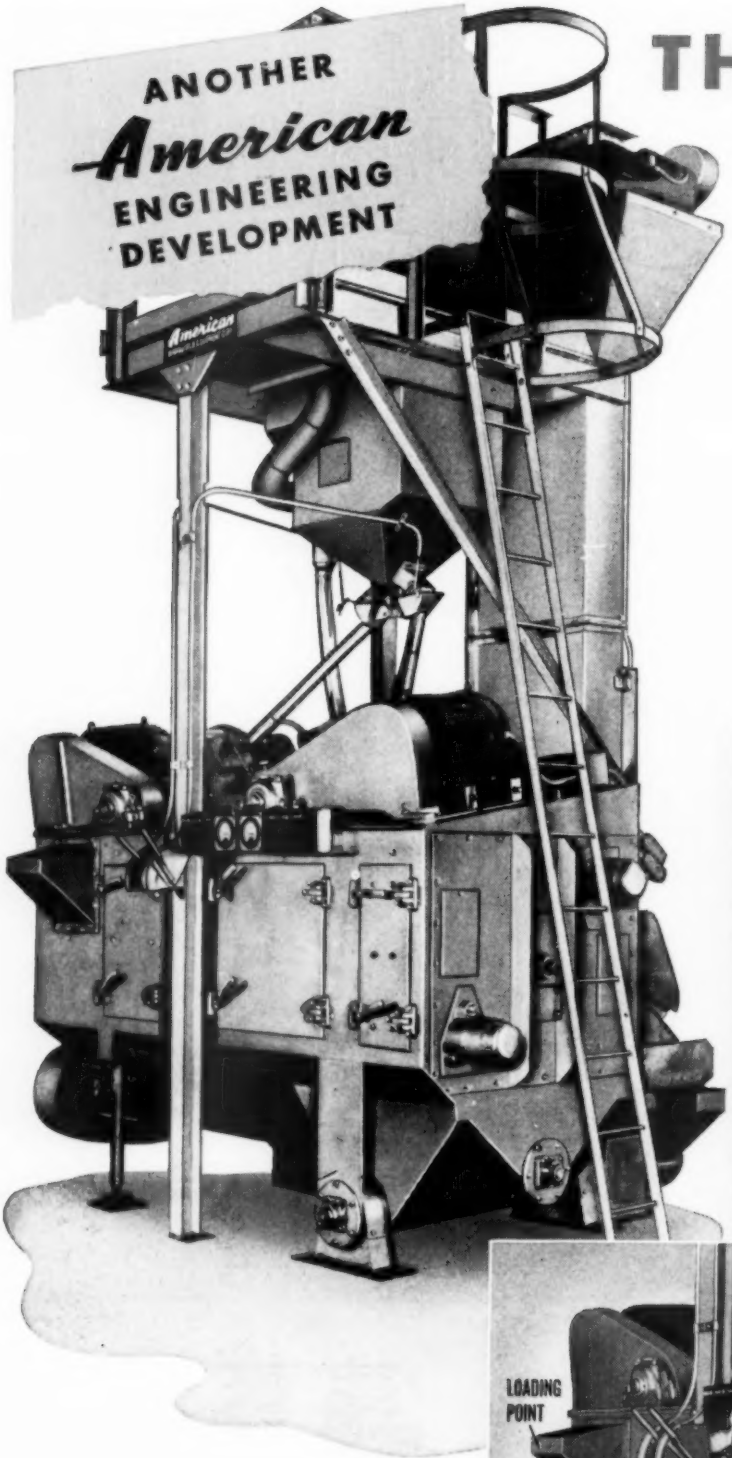


THE *Continuous* for Y

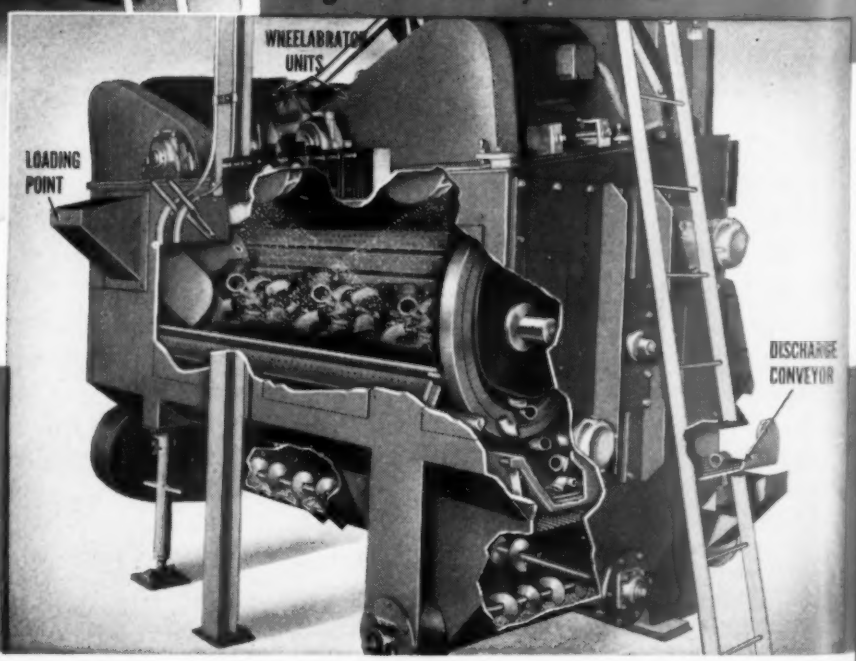
Look at These Big Advantages

1. Increases production by eliminating the time lost in a conventional batch mill for starting, stopping, loading and unloading.
2. Lends itself to line production because of its continuous operation.
3. Provides better blast coverage . . . . the work is completely exposed as it tumbles and travels progressively under the blast of one or more Wheelabrators.
4. Reduces floor space requirements . . . because it does the work of a number of machines.
5. Less power needed . . . and less connected load.

Flow of work through the cleaning chamber is continuous without interruption for loading or unloading. The mill is built around the time-tried Wheelabrator Tumblast . . . the work is completely exposed to the full effect of the blast from one or more Wheelabrators by tumbling the pieces in a chamber formed by an endless apron conveyor . . . an exclusive American development.

Progressive movement of work through the cleaning chamber is accomplished by tilting the mill to the proper angle by means of jack screws.

Since the speed of tumbling and the flow rate through the mill can be adjusted to suit the work, the speed of production and the quality of cleaning can be accurately controlled.



At right: Cutaway view showing the flow of work through the machine.

WHEELABRATOR TUMBLAST

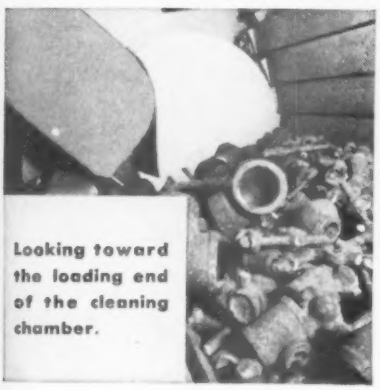
Your *High Production* Cleaning Problems

American pioneered the first Continuous blast mill and later exhibited it at the 1940 Foundry Show. Since that time the sound engineering design and performance of this machine have been proved to the satisfaction of users in some of the nation's largest industries.

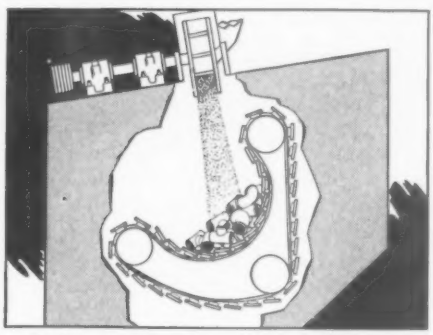
The machine illustrated will be shown in operation at the coming Foundry Show . . . it is the up-to-the-minute result of many years of engineering work on this type of equipment.

By utilizing the unique combination of tumbling and longitudinal travel of the work, plus the cleaning speed and cost-reducing advantages of the world-famed Airless Wheelabrator, this machine surpasses in productive capacity any barrel type blast equipment ever before offered.

To see the continuous mill operate . . . to see the smooth flow of cleaned castings being discharged in a continuous stream . . . is to realize the full import of this machine in slashing costs and increasing production. See it operate at the Foundry Show in Philadelphia, May 3-7. In the meantime write for descriptive Bulletin No. 514.



Looking toward the loading end of the cleaning chamber.



Endless apron conveyor provides complete exposure of work to the blast.

Cleaned castings moving toward discharge point in cleaning chamber.

VISIT AMERICAN'S EXHIBIT AT THE FOUNDRY SHOW

See the Continuous Wheelabrator Tumblast, the new model 36″ x 42″ Wheelabrator Tumblast, and other outstanding AMERICAN equipment in operation.

American

WHEELABRATOR & EQUIPMENT CORP.

(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)

505 S. Byrkit St., Mishawaka 2, Indiana

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

(*Continued from page* 152)
ing which time he has contributed much to their efficient operation and development. Mr. Sprecken is now living in Baldwin, Mich.

♦ ♦ ♦

Hartley S. Ball has been appointed general sales manager, City Pattern Foundry & Machine Co., Detroit, succeeding the late **Henry Kelley.** Mr. Ball resigned recently as assistant superintendent in charge of patterns and special foundry equipment for the iron foundry of Buick Motor Division, General Motors Corp., Flint, Mich. He had been associated with Chevrolet and Buick since 1927, when he was a journeyman patternmaker and layout man in the Detroit and Flint automobile territory.

♦ ♦ ♦

George Strahan, who has been associated with International Nickel Co., New York, for 17 years, has been appointed sales manager, Westelectric Castings Inc., Los Angeles. Mr. Strahan, a graduate of Bucknell University, served in the recent war as a lieutenant in the Air Force. He was a member of the executive committee of the New York Chapter of American Society for Metals before leaving for his new post with Westelectric Castings.

♦ ♦ ♦

Dr. A. B. Kinzel has been elected president, Union Carbide & Carbon Research Laboratories Inc., New York. Dr. Kinzel was graduated from Columbia University, Massachusetts Institute of Technology, and University of Nancy, France. He has been associated with various metallurgical units of Union Carbide & Carbon Corp. since 1926, and is the author of many papers on testing and welding of metals, metallurgy and physical chemistry of steelmaking, and on the composition, physical properties and use of ferroalloys and alloy steels. During the recent war, in addition to work for the Manhattan District, Dr. Kinzel was senior consultant on metals for War Production Board.

♦ ♦ ♦

Henry F. Kalweit, formerly controller of safety, Bridgeport Safety Emery Wheel Co. Inc., Bridgeport, Conn., has been named president of the company. Mr. Kalweit replaces **John T. Kilbride,** who has resigned as president and a director. **William G. Schultz** has been named vice president in charge of sales and the machinery division, and **Frank B. Laurich,** vice president in charge of the wheel division.

♦ ♦ ♦

Nicholas Bartlett has been named president and general manager of the H. W. Clark Co., Mattoon, Ill., succeeding **S. L. D. McClintock** who served as president last year. Mr. Bartlett has been production manager for the company for 2 years. **Martin T. Garbe** has been re-elected vice president and **L. H. Bales** has been re-elected secretary-treasurer. **Mrs. Mabel L. Clark** has been named chairman of the board of directors.

♦ ♦ ♦

W. B. Coullie, vice president and a director of Harbison-Walker Refractories Co., Pittsburgh, has retired. Mr. Coullie became associated with the company more than 40 years ago. He served as assistant general sales manager for 2 years and was appointed general sales manager in 1929. In 1937 he was elected a director of the company and has been a vice president for 7 years.

♦ ♦ ♦

Howard J. Elgin and **Charles H. Roper** have been elected vice presidents of Steel Sales Corp., Chicago, midwest distributor for various large metal producers. Mr. Elgin, a graduate of University of Illinois, has been with the company since 1935, serving in various sales capacities until 1944, when he became manager of monel and nickel sales. Mr. Roper, who attended Furman University and Clemson College, South Carolina, joined the company in 1927 as a warehouse clerk, later becoming a salesman in the Milwaukee, Minneapolis and other western territories.

♦ ♦ ♦

Russell Franks has been appointed chief metallurgist, Electro Metallurgical Co., unit of Union Carbide & Carbon Corp., New York, with headquarters in Pittsburgh. **J. N. Ludwig Jr.** has been named a division manager of service, Electro Metallurgical Co., with headquarters in Pittsburgh. Other division managers of service include: **R. J. Portman,** Chicago; and **F. W. Hanson,** New York. **W. B. McFerrin** has been appointed district manager of service, with headquarters at Detroit.

♦ ♦ ♦

J. P. Cantor, formerly in the New York office of Wheelco Instruments Co., Chicago, has been appointed district manager of the new Cleveland district office, located at 4501 Prospect Ave., where complete sales, engineering and service facilities will be available. **Herbert Proske,** associated with the company for many years, has been made assistant district manager of the New York office. **Robert Smith** is in charge of the Washington office which has been moved to 2285 Rhode Island Ave.

♦ ♦ ♦

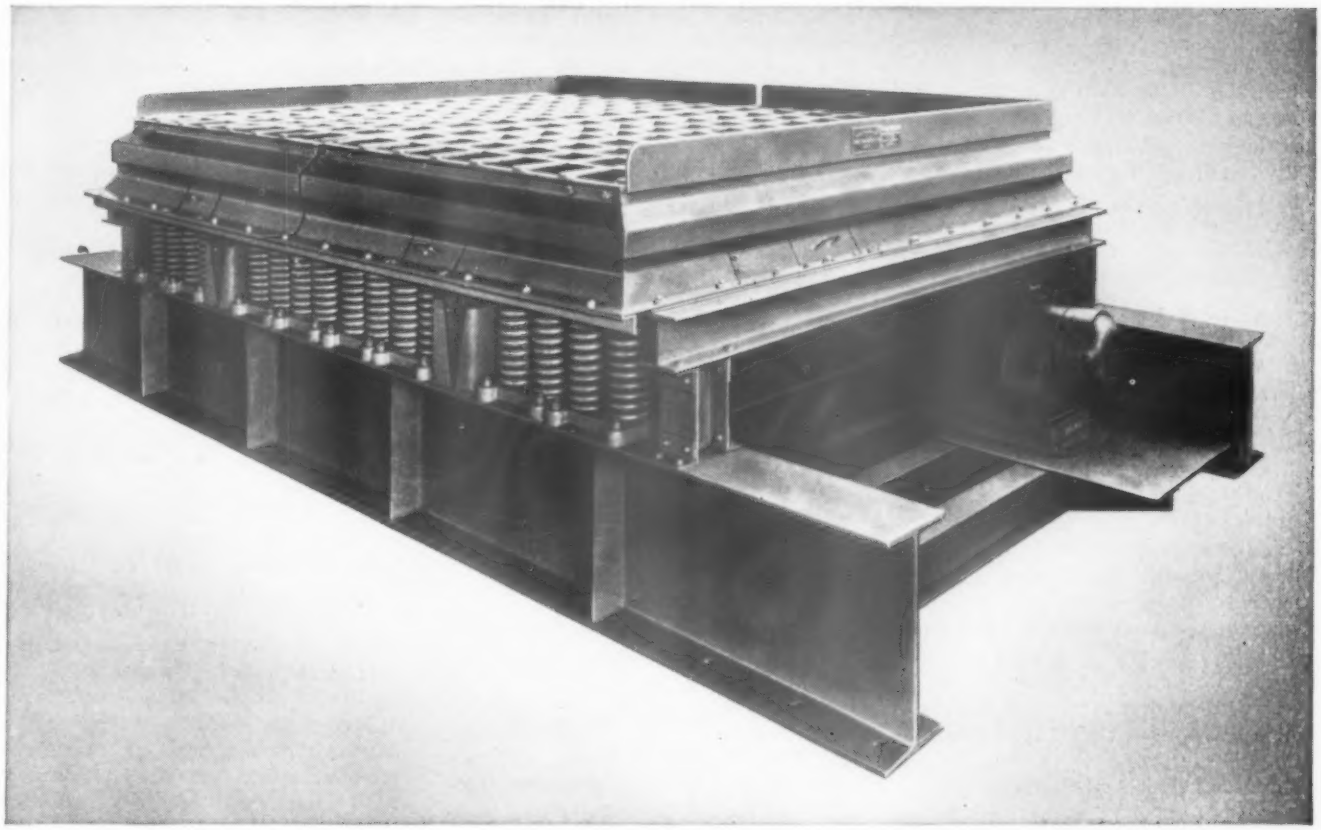
Thomas H. Appleton, until recently district sales engineer in the Baltimore office of Link-Belt Co., Chicago, has been appointed manager of its district sales office recently established at Charlotte, N. C. Mr. Appleton joined the company's Philadelphia plant in 1928, served subsequently at the Boston office and fac-

(*Continued on page* 158)

HARTLEY S. BALL

GEORGE STRAHAN

DR. A. B. KINZEL



"Fit as a fiddle"...after 4 hard years!

Heavy-duty long-hour war production fails to knock out Robins Floatex Shakeout

The owner, a foundry man for many years, could scarcely believe his eyes!

He inspected his 34-ton dual-unit, 10′ x 12′ Robins Floatex Shakeout after four years of service that included long hours of heavy-duty war-production work. To his amazement it was "fit as a fiddle!"

Wear was practically negligible. His original equipment—including decks, springs and shafts—went right back into service. As a precaution, he replaced two bearings, although they still had not reached the end of their useful life.

Such long service with low maintenance expense is typical of Robins Floatex Shakeouts. You can find hundreds of such examples in foundries all over the country. There are good reasons why.

You see, only the Robins Floatex Shakeout is genuinely *full*-floating. The horizontal vibrating deck is supported on soft, heavy-duty coil springs which prevent impact-damage to mechanism or castings. They also reduce your power requirements to a minimum. And they keep vibration from being transmitted into supporting structures. The Floatex shakes the flask, not the building!

More than that, only the Robins Floatex Shakeout has a stroke *adjustable to castings of practically any size*—from an ounce or two to 100 tons or more. You can easily and quickly adjust a Floatex that has been handling mammoth castings to handle small, light, fragile castings without damage!

Yes . . . every Robins Floatex Shakeout is designed for long, hard, dependable service. So, why not have your equipment "fit as a fiddle" in the years to come? Let a Robins engineer show you how. Write for full particulars.

SEND TODAY for your copy of Robins Bulletin 124-A. Illustrates and describes money-saving features and advantages of full-floating Floatex Foundry Shakeouts. Address Robins Conveyors Division, 270 Passaic Avenue, Passaic, New Jersey.

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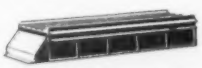
HEWITT-ROBINS INCORPORATED

ROBINS
FLOATEX SHAKEOUTS

STATIONARY

PORTABLE



SELF-DISCHARGING

3 TYPES DESIGNED TO HELP YOU 6 WAYS:

1. Save Time
2. Reduce Labor
3. Help Sand Recovery
4. Cool Hot Sand
5. Minimize Flask Breakage
6. Improve Working Conditions

(*Continued from page* 156)

tory branch store, and since 1945, has been associated with the Baltimore office. **William H. Kinkead** has been appointed district sales manager of the new office at Wilmington, Del. Mr. Kinkead entered the positive drive division of the Philadelphia plant in 1920, where he has served in various capacities until his recent appointment.

♦ ♦ ♦

Leo A. Behrendt, formerly director of the Crucible and Refractories Division, Joseph Dixon Crucible Co., Jersey City, N. J., has been elected vice president of marketing for its three industrial divisions, namely crucible and refractories, graphite and lubricants, and graphite paints. Mr. Behrendt attended University of Ilinois and in 1926 became superintendent of Chicago Crucible Co., which later became American Crucible Co. He was vice president and a director of that company when he resigned in 1936, to join the crucible division, Joseph Dixon Crucible Co. He is precident of the Crucible Manufacturers' Association.

♦ ♦ ♦

John H. Smith, formerly vice president in charge of Marketing Division, General Electric X-Ray Corp., Milwaukee, has been appointed executive vice president and a member of the board of directors. Mr. Smith will direct all manufacturing, marketing and administrative operations of the company. **Robert L. Lefevre,** until recently sales manager, has been appointed marketing manager and will direct all merchandising, sales and service activities of the company. Formerly district manager of Scott Paper Co., Mr. Lefevre joined General Electric X-Ray Corp. in 1930, and served as branch manager of the Washington office for 10 years. **Willard J. Cox,** former assistant sales manager, has been named to succeed Mr. Lefevre as sales manager. Mr. Cox has served the company for 18 years and spent 8 years as manager of the Los Angeles branch office.

♦ ♦ ♦

George H. Carden has been appointed manager of the Baltimore district office, Allis-Chalmers, Milwaukee. Mr. Carden was graduated from Alabama Polytechnic Institute, and joined Allis-Chalmers in 1930. He had been Washington district office sales representative since 1943. **T. G. Smith,** formerly sales representative in the company's New Orleans office, has been named resident representative at Beaumont, Tex. Mr. Smith joined the company in 1930, following graduation from North Carolina State College.

♦ ♦ ♦

A. S. Terry, formerly head of the Detroit district office, the Bellows Co., Akron, O., has been appointed sales manager of the company. A graduate of University of Michigan, Mr. Terry spent 11 years with the Shell Oil Co. and 10 years with General Motors, in executive sales positions in United States and Canada, prior to his association with the Bellows Co.

♦ ♦ ♦

J. G. Pearce, director, British Cast Iron Research Association, Alvechurch, Birmingham, England, and **H. Morrogh,** research manager, British Cast Iron Research Association, will attend the annual convention of the American Foundrymen's Association in Philadelphia. Mr. Morrogn will present a paper before the convention.

♦ ♦ ♦

William B. Todd has resigned as assistant to the president, Aetna Standard Engineering Co., Youngstown, O., and has been elected executive vice president and a director of Continental Foundry & Machine Co., East Chicago, Ind., with headquarters in Pittsburgh. In 1937, Mr. Todd left Jones & Laughlin Steel Corp., Pittsburgh, where he had served as vice president in charge of sales, to join the Steel Export Association of America, with headquarters in London. At the beginning of the war he returned to this country and remained with the association in New York, until 1943, when he was sent to London as foreign representative for the Steel Division, War Production Board. He joined Aetna Standard in 1945.

♦ ♦ ♦

G. M. Buchanan has been placed in charge of the branch office recently established at Charlotte, N. C., by Black & Decker Mfg. Co., Towson, Md., to serve North and South Carolina. **J. P. Spain,** formerly sales engineer at Chicago, succeeds Mr. Buchanan as branch manager of the Baltimore office. **Arthur S. Boehm,** until recently sales engineer at Pittsburgh, has been named San Francisco branch manager, replacing **A. W. Helbush** who has resigned.

♦ ♦ ♦

J. J. Grady has been elected president and a director of Exothermic Alloys Sales & Service Inc., which has recently moved its offices from Massillon, O., to Chicago. Mr. Grady succeeds **Frederick J. Griffiths,** who has resigned. **D. V. Hamilton,** sales manager, has also been elected a director of the company. **D. D. Tipton** has been appointed treasurer.

♦ ♦ ♦

Bert E. Brashares has been appointed sales engineer in the steel castings department, Continental Foundry & Machine Co., East Chicago, Ind., with headquarters in Pittsburgh, where he will service the

(*Continued on page* 160)

LEO A. BEHRENDT

WILLARD J. COX

JOHN H. SMITH

Look at that detail

THERE is detail to look at when you use Krause Truscor or Amerikor Cereal Binders in the making of your cores.

Added to a core mix, Truscor and Amerikor give a better surface finish . . . more accurate handling of detail.

Accuracy of detail results from greater flowability. Extra green strength, improved collapsibility, faster operations, less wastage — these are other advantages of these superior cereal binders made from corn.

Specify Krause Truscor or Amerikor on your next order — Truscor if you like a light-weight binder; Amerikor, if you prefer a heavier mixture.

CHAS. A. KRAUSE MILLING CO., MILWAUKEE 1, WIS.
World's largest millers of dry corn.

CEREAL BINDERS

DISTRIBUTORS

M. A. Bell Co., 3430 Brighton Blvd., Denver, Colo.
M. A. Bell Co., 401 Velasco St. Houston, Texas
M. A. Bell Co., St. Louis 2, Mo.
A. L. Cavedo & Son, Inc. Richmond 21, Va.
Foundry Supplies Co. Chicago 16, Ill.
J. H. Hatten, Lansdowne, Pa.
Independent Foundry Supply Co., Los Angeles 11, Calif.
Joseph B. Meier, 96 N. 18th St., East Orange, N. J.
Marthens & Co., Moline, Ill.
Carl F. Miller & Co. Seattle 4, Wash.
Milwaukee Chaplet & Mfg. Co., Milwaukee 4, Wis.
Pacific Graphite Works Oakland 8, Calif.
Porter-Warner Chattanooga 2, Tenn.
Smith-Sharpe Co. Minneapolis 14, Minn.
Frederic B. Stevens, Inc. Buffalo 12, N. Y.
Frederic B. Stevens, Inc. Cleveland 14, Ohio
Frederic B. Stevens, Inc. Detroit 26, Mich.
Western Industrial Supply Co. 208 S. E. Hawthorne Blvd. Portland 14, Oregon

(*Continued from page* 158)

middle Atlantic states. Mr. Brashares was connected formerly with Ohio Steel Foundry Co., Lima, O., Commercial Steel Castings Co., Marion, O., and most recently with the Otis Casting Division of Jones & Laughlin Steel Corp., Cleveland.

♦ ♦ ♦

Frank E. Wartgow has been elected vice president, Castle & Associates Inc, personnel counsellors, 200 S. State St., Chicago. He will have charge of the newly formed foundry division which is offering a specialized and complete personnel service to the foundry industry. Mr. Wartgow comes to the Castle organization with a broad background and extensive experience in the foundry field. His most recent connection was with the Whiting Corp., Harvey, Ill., in the foundry equipment division. Prior to that, he was a supervising engineer with Hasbrouck Haynes Engineers, Chicago, and before that he held supervisory positions with American Steel Foundries, Chicago.

♦ ♦ ♦

Harold H. Mueller has joined the foundry service staff of Meehanite Metal Corp., New Rochelle, N. Y. Mr. Mueller, who is a sand and molding technician, will have his headquarters in the Cleveland office of the corporation. Previous connections include Minster Machine Co., Minster, O., and Cincinnati Milling Machine Co., Cincinnati.

♦ ♦ ♦

Arthur A. Clay, for the last 6 years controller for Ohio Steel Foundry Co., Lima, O., has resigned to enter business for himself as a foundry-machine shop consultant. Mr. Clay's office is in the Y.M.C.A. building, Lima, where he will specialize in cost systems, production and cost control, profit analysis, etc. A graduate of New York University, he subsequently took post-graduate work in production engineering, time and motion study. During the last 5 years he has taught night courses at Ohio Northern University, specializing in foundry and cost accounting. Mr. Clay has appeared before foundrymen at conventions and meetings, discussing cost control and reduction and has written numerous articles outlining cost systems for the industry.

♦ ♦ ♦

C. B. McGehee, formerly general manager of sales, Truscon Steel Co., Youngstown, O., has resigned to become president of the William H. Harman Corp., Wilmington, Del. Mr. McGehee joined the Truscon organization in 1927 as a concrete and steel design engineer, was appointed manager of highway products sales in 1938, and became general sales manager in 1940.

♦ ♦ ♦

Kenneth L. Selby has been appointed chief engineer of the Railway Division, National Malleable & Steel Castings Co., Cleveland, succeeding the late Howard W. Gilbert. Mr. Selby was graduated from Purdue University and spent 11 years with the Pullman Co., Illinois Central Railroad and the Alton Railroad before joining National Malleable in 1945.

♦ ♦ ♦

Julius W. Marx has been appointed chief engineer, Newcomb-Detroit Co., Detroit. Mr. Marx, a graduate of Michigan State College, has recently been plant engineer, General Motors Truck & Coach Division and prior to that was at its Fisher Body Division.

♦ ♦ ♦

H. S. Robertson has been elected vice president, Harbison-Walker Refractories Co., Pittsburgh. Mr. Robertson has been associated with the company since he was graduated from University of Illinois in 1916, his activities having been devoted almost exclusively to sales. He was appointed general sales manager in 1940 and has been a director since 1943. **F. W. Sheppard** succeeds Mr. Robertson as general sales manager. Mr. Sheppard was graduated from Citadel Military College and was associated with Tennessee Coal Iron & Railroad Co., Birmingham, until 1922 when he joined Harbison-Walker. He has been Birmingham district sales manager since 1926. **C. A. Brashares** has been appointed to succeed Mr. Sheppard as Birmingham district sales manager. Following graduation from Case Institute of Technology in 1928, Mr. Brashares entered the research department of the company. He was transferred to the sales technical department and served in the Pittsburgh and Charlotte, N. C., sales offices. He has most recently been associated with the Pittsburgh office.

♦ ♦ ♦

William J. Priestley has been elected a director of Union Carbide & Carbon Corp., New York. Mr. Priestley has been associated with the organization since 1923, and has been a vice president in charge of the Alloys and Metals Division since 1945. He is also president of Electro Metallurgical Co., subsidiary of Union Carbide & Carbon Corp.

♦ ♦ ♦

Edward B. Nitchie, until recently works manager, Cutter Laboratories, Berkeley, Calif., has been appointed manager of operations and engineering, Basic Refractories Inc., Cleveland. Mr. Nitchie was graduated from Sheffield Scientific School and Yale University.

♦ ♦ ♦

L. A. Hamilton has been appointed vice president in charge of the Seattle, Wash., district office of Air Reduction Pacific Co., the new sub-

(*Continued on page* 162)

FRANK E. WARTGOW

HAROLD H. MUELLER

ARTHUR A. CLAY

BAY STATE®

BAYFLEX®

Time saver—

money maker—

easier—

faster!—

---write them today!

Foundry and metal-fabricating shop operators are overwhelmed with their increased piece work production from BAYFLEX RAISED HUB DISC WHEELS.

Yes, where heavy duty portable grinders and sanders are used the jobs can now be done much faster—easier—cleaner. No wonder that BAYFLEX is so popular with management and operators alike!

The merits of this new product are many . . . the production possibilities unlimited. To appreciate the full value of BAYFLEX however, you must see it in operation. Ask for a demonstration at your plant. No obligation.

Branch offices and warehouses —
Chicago — Detroit
Distributors — All Principal cities

Unexcelled for cleaning castings.

For welds on angle-iron frames.

For hard-to-get-at places.

Has no equal for smoothing welds.

Hundreds of uses in auto repair shops.

A "MUST" for metal-fabricating shops.

Top Performance Consistently Duplicated

BAY STATE ABRASIVE PRODUCTS CO., WESTBORO, MASS., U. S. A.

(*Continued from page* 160)

sidiary of Air Reduction Co. Inc., recently organized to take over West coast business of Air Reduction Sales Co., New York. Other vice presidents appointed to take charge of western offices include: **E. W. MacCorkle Jr.,** Portland, Oreg.; **H. W. Saunders,** San Francisco; and **H. A. Hoth,** Los Angeles.

♦ ♦ ♦

Robert L. Lowder, formerly district sales engineer at the Atlanta plant of Link-Belt Co., Chicago, has been appointed district sales manager in charge of the new district sales office recently established in Jacksonville, Fla. Mr. Lowder joined the Philadelphia plant of the company in 1915, and has been a member of the Atlanta office sales department since 1927.

♦ ♦ ♦

William N. Brammer, for the last 9 years connected with the Aluminum Division, Thompson Products Co., Cleveland, has joined Nylen Products Co., St. Joseph, Mich., as foundry superintendent. He is equipping and organizing a plant, designing machines, molds and furnaces for the production of aluminum mold automotive pistons.

♦ ♦ ♦

Gilbert F. Close has been appointed director of public relations, General Steel Castings Corp., Eddystone, Pa. Mr. Close has been director of personnel at the Commonwealth Division of the company, in Granite City, Ill., since 1940. He has been associated with Commonwealth and General Steel Castings Corp. since 1920.

♦ ♦ ♦

Glenn W. Merrefield has been appointed sales engineer in the Michigan territory of Champion Foundry & Machine Co., Chicago. Mr. Merrefield has been senior engineer on foundry operations and design for Lester B. Knight & Associates Inc., Chicago, for the last 2 years. He has been associated with the foundry industry for over 30 years, in various capacities. An active member of the American Foundrymen's Association, he has served on national committees and as vice chairman and a director of its Southern California Chapter.

GLENN W. MERREFIELD

♦ ♦ ♦

Robert B. Newbert has been appointed assistant general purchasing agent, American Brake Shoe Co., New York, succeeding **William H. Old,** now general purchasing agent. Mr. Newbert, a graduate of Rider College, Trenton, N. J., has been associated with the company since 1934.

♦ ♦ ♦

Alfred Iddles has been elected president, the Babcock & Wilcox Co., New York, succeeding **A. G. Pratt,** who has been named chairman of the board of directors. Mr. Pratt, who has been associated with the company for 45 years, served as vice president for 7 years and was elected president 24 years ago. Mr. Iddles, who has been engaged in engineering and construction work during his business career, joined the company in 1937 and became a vice president in 1945. **W. T. McCullough Jr.,** who is in charge of stationary boiler sales and was formerly sales manager of the company's Chicago office, has been elected a vice president, and **W. G. Dryden,** formerly treasurer, has been named secretary-treasurer. **C. W. Middleton,** vice president and secretary, has withdrawn from full-time active service but will continue as a director and act in a consulting capacity.

♦ ♦ ♦

John J. Risko has been appointed assistant sales manager, Hendrick Mfg. Co., Carbondale, Pa. Mr. Risko attended Oberlin School of Commerce and Case Institute of Technology. For 6 years he was manager of the sales order department of SAE Steels, Cleveland, and recently was a salesman for Columbia Tool Steel Co., Chicago Heights, Ill.

♦ ♦ ♦

W. F. Rockwell, president, Rockwell Mfg. Co., Pittsburgh, has been elected to the board of directors of Pennsylvania State Chamber of Commerce. Mr. Rockwell has also been appointed to the legislative advisory subcommittee for the World Trade Council, sponsored by the Pittsburgh Chamber of Commerce.

♦ ♦ ♦

R. D. Baysinger has been appointed superintendent of the foundry division, Greenlee Brothers & Co., Rockford, Ill. **R. I. Rollins** has been named foreman of heavy molding in that division.

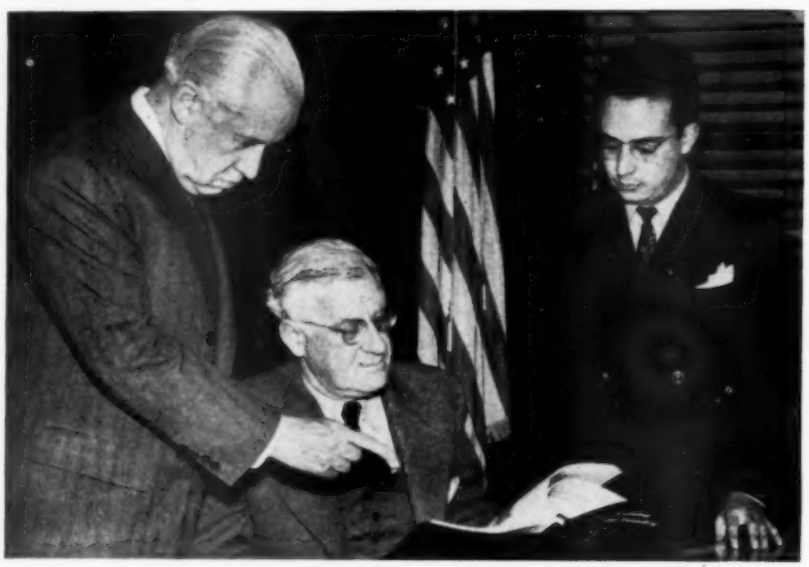
♦ ♦ ♦

Harry A. Dunphy has been appointed general superintendent, New England Malleable Co., Lincoln Park, R. I. Mr. Dunphy recently was assistant superintendent, Dalton Foundries Inc., Warsaw, Ind.

♦ ♦ ♦

R. F. Teeling has been appointed manager of the North Jersey branch office of the Manhattan Rubber Division, Raybestos-Manhattan Inc. Pas-

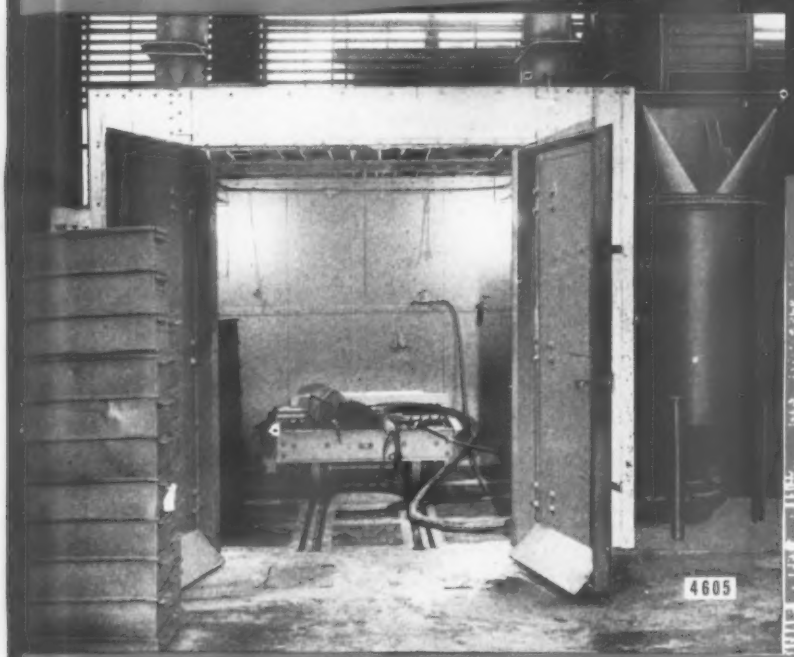
(*Concluded on page* 164)



EXCHANGE STUDENT Jaime E. Posada, Columbia, South America, is currently in training at the Hansell-Elcock Co.'s Chicago plant. Left to right, above, are Henry S. Faust, president, Hansell-Elcock Co.; Leroy E. Roark, executive vice president, National Founders Association, Chicago, and Mr. Posada

FOR YOUR CLEANING ROOM

SLY BLAST ROOM

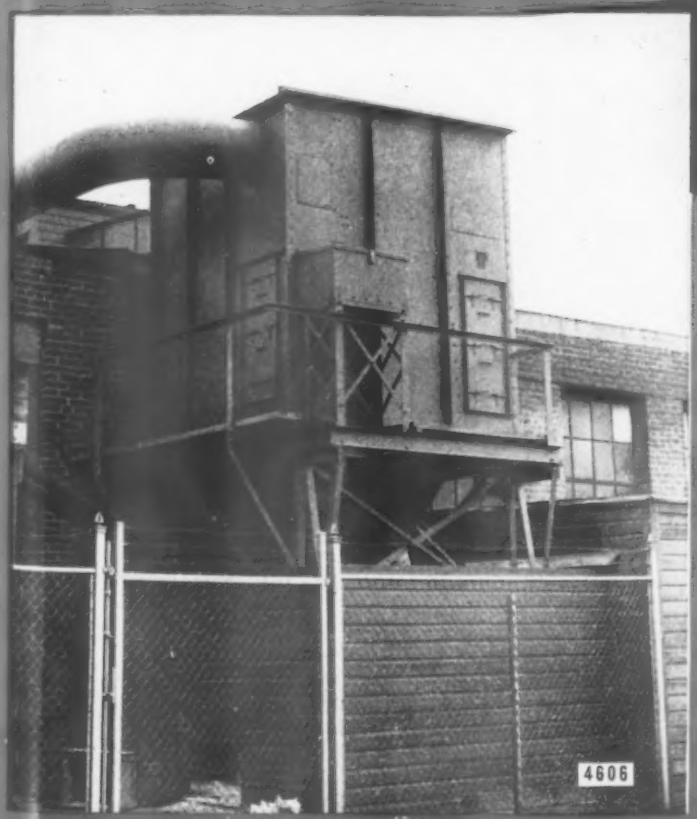


This Blast Room receives the rough castings for blasting. The operator wears a Sly Helmet (shown on the car). Piping connects Room with the Sly Filter.

Sly features are: excellent illumination from plenty of dust-tight lighting fixtures; over-all, down-draft ventilation from *triple* construction ceiling; safety and ease in working aided by double floor of grating and perforated plates; used abrasive automatically cleaned and returned. All these help get more production.

Sly Blast Room (above) and Sly Dust Filter (below) at The Apex Electrical Mfg. Co., Cleveland, Ohio

SLY DUST COLLECTOR



This Dust Collector is connected with the Sly Blast Room by piping through which the dust-laden air is exhausted. Upon reaching the Filter, all dust is removed, by filtration through cloth, and drops into a hopper from which it is drawn off into a wheelbarrow underneath.

Installed five years ago, this Sly Dust Collector, like thousands of others, has given highly satisfactory service and has cost but little to operate and maintain. By efficiently exhausting the dust-laden air from the Blast Room, it has helped to do better blasting, in greater volume.

Have you a problem involving *dust* or *blast cleaning*? We'd like to hear from you.

THE W. W. SLY MANUFACTURING CO. 4753 TRAIN AVENUE CLEVELAND 2, OHIO

(*Concluded from page* 162)

saic, N. J., succeeding the late **Grannell E. Knox,** who had managed the sales branch for 34 years. Mr. Teeling has been associated with the company for 36 years.

• • •

James L. Myers, executive vice president, Cleveland Graphite Bronze Co., Cleveland, has been named president, succeeding **Ben F. Hopkins,** who has been made chairman of the board of directors. **Carl W. Johnson,** vice president in charge of sales, has been appointed senior vice president. **John W. Dixon,** formerly treasurer and controller, has been named vice president and treasurer, and **William G. Laffer,** works manager, retains that position and has also been made a vice president.

• • •

George P. Holman, until recently metallurgist and chief chemist, Detroit Steel Casting Co., Detroit has been appointed metallurgist with the engineering department of Chrysler Corp., Detroit, currently assigned to the Dodge Division forge plant.

• • •

William C. Appleby, assistant to the president of Southern Wheel Division, American Brake Shoe Co., New York, has retired, following 42 years of service with the company. Mr. Appleby, a graduate of Georgia School of Technology, served for nearly 23 years in various engineering and supervisory capacities in company plants in the South. In 1929 he was transferred to New York, and became assistant to the president of Southern Wheel Division in 1944.

• • •

Arthur C. Croft, president of the National Foremen's Institute, publisher of business, labor relations and supervisory training services, has been elected a director of Western Foundry Co., Chicago.

• • •

J. C. Wade has been appointed assistant purchasing agent, Cummins Engine Co., Columbus, Ind., replacing **Charles W. Hathaway,** who has resigned.

• • •

R. L. Baldwin has retired as sales development manager, electrode products, National Carbon Co., Niagara Falls, N. Y. and now is located at 38 Park Lane Drive, Orinda, Calif.

• • •

Foster C. Koehn has been appointed plant manager of the Falk Corp., Milwaukee. Mr. Koehn has been associated with the company for 25 years.

• • •

Raymond J. Hurley has been elected chairman, Thor Corp., Chicago, to succeed his brother, Edward M. Hurley Jr., who died Feb. 28.

Studies Wages of Foundry Workers

A study by the Bureau of Labor Statistics, Washington, shows that straight-time hourly earnings of machine molders in ferrous foundries averaged over $1.70 in November, 1947, in 12 of the 23 large cities studied. Average earnings of floor molders and hand bench molders generally ranged between $1.50 and $1.70 an hour. Machine molders frequently are paid on an incentive basis whereas other molders are more commonly paid on a time basis. Overtime and shift premiums are not included in the figures.

November earnings for the eight occupations included in the study represent an increase of about 10 per cent compared with October, 1946, and approximately a 30 per cent increase over January, 1945.

Since January, 1945, proportionately the greatest gains in earnings in most cities were shown for shakeout men, although in a number of cities wood patternmakers showed the greatest gain. Birmingham showed the greatest percentage increase in earnings—at least 40 per cent since January, 1945, in each of the occupations studied. Except for patternmakers, earnings remained lower in Birmingham than in any other city studied.

AT M.I.T.: This group was photographed at the installation Mar. 2 of a student chapter of the American Foundrymen's Association at Massachusetts Institute of Technology, Cambridge, Mass. Shown in the front row, left to right, are: William W. Maloney, AFA secretary-treasurer; Prof. John Chipman, M.I.T.; Max Kuniansky, AFA president; Gerald J. Grott, chapter chairman; Rufus F. Harrington, Hunt-Spiller Mfg. Corp., industrial advisor to the chapter. Back row: Merton Hosmer, Hunt-Spiller Mfg. Corp.; Prof. Howard F. Taylor, M.I.T., faculty advisor to the chapter; Prof. Erwin H. Schnell, M.I.T.; Prof. Nicholas J. Grant, M.I.T.; Martin J. O'Brien, chapter secretary-treasurer; Walter Clark, D. W. Clark & Co., Boston; Leonard McKibben, chapter vice chairman

THIS MONTH, 62,562* BUYERS OF CASTINGS WILL READ THIS AD...

This is one of a series of 6 full page ads emphasizing the expanding industrial acceptance of Brass Castings. Nationally circulated in outstanding trade journals and read by manufacturers, engineers, contractors, metallurgists, production control men—*these messages reach the men who specify and influence the purchasing of castings!*

R. Lavin & Sons, Inc.

ARCHITECTS AND BUILDERS AGREE
Bronze Ornaments Retain Their Lasting Beauty!
The beauty of Brass or Bronze ornamental works is inherent in the metal from which it is cast. The architect and builder know that there is no substitute for Bronze when lasting beauty is essential.
Specify— LAVIN NON-FERROUS INGOT—Quality
R. LAVIN & SONS, INC.
Refiners of Brass, Bronze and Aluminum
3426 SOUTH KEDZIE AVENUE · CHICAGO 23, ILLINOIS
REPRESENTATIVES IN PRINCIPAL CITIES

* Audited Circulation plus pass-on readership.

REPRINTS OF ENTIRE *Brass Castings* SERIES ARE YOURS FOR THE ASKING

The Foundryman's Problems . . . Are Our Problems!

Man-to-Man

ON THE MOLDER'S BENCH

"Hangar Flying at the Convention"

By RALPH L. LEE

MANY years ago my Dad told me about the time an electrical engineer came to work at his shop. This engineer, by the way, later became internationally famous for his many and highly successful inventions. The first morning the engineer showed up for work he found the office they had given him was enclosed in frosted glass with a Yale lock on the door and a little sign beside the lock lettered, "NO ADMITTANCE, See Chief Engineer."

When the engineer asked, "Why all the frosted glass, lock and stuff?" they said—"Why good gracious man, here we spend thousands and thousands each year developing new inventions. Do you think for one moment we want these ideas we have hired you to work out for us to leak out and fall into our competitors' hands?"

"Oh, I see," said the engineer, "but wait a minute. Have you ever thought you might be locking *out* more ideas than you lock *in?*"

This story of my Dad's came to mind the other day as I thought back over the hundreds of visits I have made to foundries, factories and shops in every kind of business imaginable all over the country. Now that I think of it, there has been only one among all these plants where they even had one no-admittance sign on the door of one department. All the others were as open as all outdoors, and my hosts were not only willing to show me what they were doing but proud and anxious to do it.

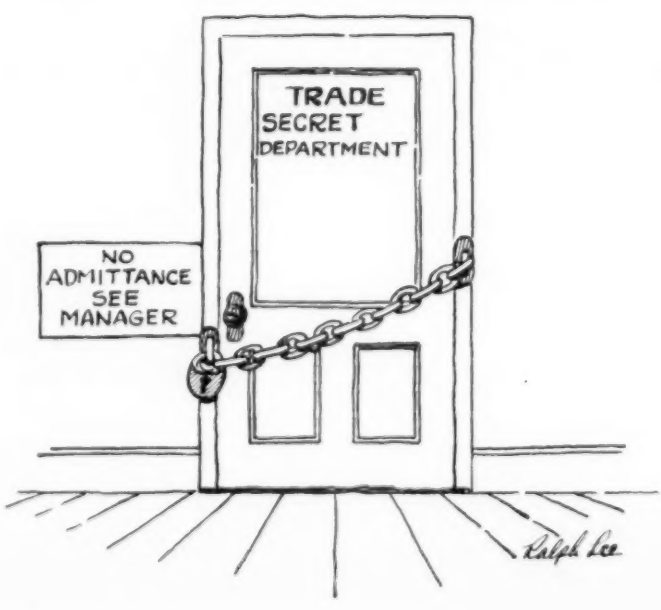
I couldn't help but think that our convention this month is further proof of the extent to which *trade secret swapping* has become the rule rather than the exception in the foundry business. I guess it will be pretty hard to think of even one foundry angle that won't be covered in some way among the many papers read, the exhibits visited, or the unscheduled kitchen conventions in this room and that, including refreshment parlors.

Speaking of kitchen conventions, probably one of the greatest satisfactions of learning to fly is the right it gives a fellow to *hangar flying*, that is, horning in on a group of pilots sitting around in the hangar telling tall tales about close shaves, pet tricks and just the fun of flying.

While I haven't lost sight of my amateur standing in the foundry by any means, I have found that foundrymen too are just as bad (or as good) as pilots when it comes to shooting off their mouths about what they are doing. Being able to talk the lingo and having been through the mill far enough to be elected into that little inner circle ranks in my opinion right along side of profit and pay as a compensation for all you go through to learn the business.

While there may be some, I don't believe I've ever heard of anyone who wrecked his business by letting the cat out of the bag in one of these foundry hangar flying sessions. But I have heard of plenty of people who picked up just one little tip that helped them over the hump on one real heap of trouble they were having.

Right along this line, someone was telling me of the time when they were trying to develop rayon and hadn't gotten very far. In a joint meeting of British and American rayon experimenters, both the British and the Americans found that the British had long since licked the very problem that was stumping the Americans and the Americans had licked the problem that was stumping the Britishers. By swapping they both got the best of the deal.



You know, when you get right down to it, it would be pretty hard for any outsider to walk down through any plant and carry away with him the real nubbin or secret of the success of that outfit. I have always felt that the real know-how and the knack that spells the difference between success and failure can't be put down on paper or even put into words. So there isn't much danger of anyone running away with the secret formula, no matter how brilliant the shoplifter. If the formula is so pat and so portable that it can be car-

(*Concluded on page* 169)

ANNOUNCING

3 *NEW* and improved Aluminum Alloys

—developed and perfected for foundry use in the metallurgical laboratories of Wm. F. Jobbins, Inc.

JOBBINS ALMAG 35 ....*A light alloy replacement for malleable iron*

37,000 to 42,000 tensile, 13.0% to 15.0% elongation, as cast, results with a new aluminum-magnesium alloy, requiring no heat treatment or aging. Has highest shock resistance, machinability and corrosion resistance of any aluminum alloy. *Replaces malleable iron at one-third the weight and with greatly decreased machining costs.* —Bulletin 35-F

JOBBINS 3-6 SUPREME ....*A NEW—more castable aluminum alloy for sand*

Maximum castability in sand comes with an improved aluminum-copper-silicon alloy. High fluidity and low shrinkage minimize foundry scrap. Has high physicals, as-cast, and is heat-treatable to the highest of any non-premium AXXX sand cast aluminum. Has excellent impact resistance, endurance limit, pressure tightness. *A one alloy replacement for nearly all sand cast aluminum.* —Bulletin 36-F.

JOBBINS 4-8 SUPREME ...*An improved aluminum alloy for permanent molding.*

A faster-casting cycle in permanent molds accompanies freedom from hot-shortness and shrinkage in a new aluminum-copper-silicon composition. Castings have superior pressure tightness and soundness. Physical properties are superior as-cast and can be heat-treated to the highest of any chill-cast aluminum. *High foundry economy and wide customer application result from these properties.* —Bulletin 48-F

Many Gray Iron Parts can be made economically from *available* Jobbins 3-6 or 4-8 Supreme

WILLIAM F. JOBBINS, INC., AURORA, ILL.

PRODUCERS OF PRIMARY & SECONDARY ALUMINUM ALLOYS

SALES REPRESENTATIVES LOCATED IN THE FOLLOWING CITIES

R. L. Brown, 188 W. Randolph St., Chicago, Illinois
C. R. Hilb, 908 Provident Bank Bldg., Cincinnati 2, Ohio
Wayne Martin, 2135 Columbus Road, Cleveland, Ohio
C. F. Allison, 2525 Highland Ave., Birmingham, Alabama
Ralph E. Zimmerman, 718 Fisher Building, Detroit 2, Michigan
Pittsburgh Alloy Corp., 341 Oliver Bldg., Pittsburgh 22, Pa.

LABOR—PIG IRON—SCRAP—COKE

Determine Profit and Selling Price of Castings

Mr. Manager, are you apprehensive of future price trend and profitable operation? Do you plan to meet competition by increasing the efficiency and productiveness of labor? Whether you manage a large or small, gray iron, steel, malleable iron or non-ferrous foundry, we can assist you. Nationally known firms will vouch for our ability to initiate improvements and rectify wasteful practices. We have nothing to sell except dependable counsel and service, directed solely to the interests of our clients.

A study, beginning with incoming raw material and following through to the shipping platform, will disclose means to improve working conditions and introduce new production methods, power driven labor saving machinery and devices, to cut cost in all departments. Such a survey will give us a clear understanding of your problems, and will enable us to submit recommendations, plans and specifications, which may embrace an entire new plant or a single special purpose machine.

When all important details are decided upon, we will obtain quotations from many sources, and all bidders will be quoting on what you need, not what the manufacturer wants to sell. Your own organization will award contracts and issue all purchase orders. Installation and erection can be performed by your own men, under our supervision. Information and drawings related to the new improvements are shared only by your organization and ourselves.

By following our method of procedure, you will expedite plant modernization or expansion at the lowest cost and without delay. All uncertainties are eliminated before contracts are placed, and you are not depending upon one make of equipment or one source of supply when replacement parts are needed or when alterations or expansions are required.

Please write for our illustrated and instructive
Brochure "F".

A. A. WICKLAND & CO.

Foundry Engineers.

ENGINEERING BUILDING Established 1919 CHICAGO 6, ILLINOIS

(*Concluded from page* 166)

ried away, then there is considerable question as to the success of that outfit.

The more I see as I go around the more I am convinced that God didn't favor one spot very much over any other when it comes to passing out brains. Most folks are pretty smart and pretty dumb (sometimes) even as you and I. This being the case I think my Dad's engineer friend was on the right track when he said there was a real danger of locking out more than we lock in. "Going to the convention in this frame of mind mightn't be such a bad idea. I'm going to try it and, another thing this year, I sure am going to make more notes than I did last year. I have been kicking myself in the pants ever since trying to remember a lot of good things I know darned well I saw and heard. Hope I'll be seeing you all at the convention.

AFA MEETS IN PHILADELPHIA

(*Continued from page* 103)

Graduates luncheon, Wednesday, and the division's annual business meeting.

M. J. Gregory, Peoria, Ill., retired foundry superintendent of Caterpillar Tractor Co. and a past director of the AFA, will be discussion leader on "Management's Responsibility in the Development of Personnel" at the dinner. Dr. R. M. Brick, director of the department of metallurgy at the University of Pennsylvania, will speak on "Engineering Education" at the luncheon.

Interest in the educational activities of the industry today is also focused in a special Philadelphia Chapter group, the Educational Exhibit Committee, headed by A. C. Gocher, foundry superintendent, Fletcher Works Inc., Philadelphia.

Members include Dr. R. M. Brick, Department of Metallurgy, University of Pennsylvania; John L. Gross, co-ordinator, and Edward Saks, instructor, Murrell Dobbins Vocational-Technical School, Philadelphia; A. W. Grosvenor, professor of metallurgical engineering, Drexel Institute of Technology, Philadelphia; D. J. Jones, New Jersey Silica Sand Co., Millville, N. J.; C. L. Lane, metallurgist, Florence (N. J.) Pipe Foundry & Machine Co.; Charles W. Mooney, superintendent, the Olney Foundry Division of Link-Belt Co., Philadelphia; J. J. Thompson, assistant foundry superintendent, Fletcher Works Inc.; J. B. Vernon, Dodge Steel Co., Philadelphia; S. B. Wentz, president, Pennsylvania Foundry Supply & Sand Co., Philadelphia; H. J. Williams, sales manager, New Jersey Silica Sand Co.

Murrell Dobbins school is an exhibitor in the show this year, and is also one of the firms that will hold open house for delegates on the plant visitation program.

This year's special lecture series sponsored by AFA's Annual Lecture Committee, one of the three instructional courses scheduled during the convention, will be presented at 4 p.m. Monday through Thursday. Its five sessions will cover quality control test procedures for aluminum and magnesium; brass, bronze and nickel alloys; malleable iron; gray iron, and steel.

E. V. Blackmun, chief works metallurgist, Aluminum Co. of America, Cleveland, will present the light metals discussion Monday; William Romanoff, vice president, H. Kramer & Co., Chicago, and Myron O. Booth, manager, Saginaw (Mich.) Malleable plant of Central Foundry Division, General Motors Corp., those on brass-bronze-nickel and malleable, Tuesday; Fred J. Walls, manager of the Detroit section, International Nickel Co., gray iron, Wednesday, and John W. Juppenlatz, chief metallurgist, Lebanon (Pa.) Steel Foundry, steel, Thursday.

Shop courses sponsored by Gray Iron and Sand divisions are scheduled for 8 p.m. Monday through Thursday, the late hour being chosen to permit local technologists and production men to attend after working hours. Off-the-record discussion at these informal meetings has always proved valuable and interesting in past years, and thousands of Philadelphia area foundrymen are expected to take advantage of the opportunity to attend.

Gray iron meetings will take up "Front Slagging of the Cupola," Monday; "Effect of Blast Variation on Cupola Control," Tuesday; "Cupola Coke," Wednesday; "Factors Affecting the Fluidity of Cupola Iron," Thursday.

Sand practices and problems in nonferrous, malleable, gray iron, and steel, will be covered in that order, Monday through Thursday.

William Morley, foundry manager of the Olney Foundry division of Link-Belt Co., heads the Philadelphia Chapter Shop Course Promotion Committee for the annual meeting. Arnold Kraft, foundry manager of

(*Concluded on page* 172)

Ladies' Entertainment Program

PHILADELPHIA Chapter's Ladies' Entertainment Committee, working under the direction of Mr. and Mrs. Howard J. Williams, has planned an interesting program for ladies attending the convention. Following is an outline of events scheduled to make the visit to the historical city memorable and pleasant:

Monday, May 3: Registration at the Bellevue-Stratford Hotel, Monday through Thursday. Members of the committee will be present at all times to assist. Ladies are requested to register as early as possible in the week, to enable the committee to anticipate arrangements for group handling.

Tuesday, May 4: (2:30 to 4:30 p.m.) Ladies will be guests of the association at a reception and tea in the auditorium of John Wanamaker's department store, where a fashion show will be presented.

Wednesday, May 5: (9:30 a.m.) Motor buses will leave Bellevue-Stratford Hotel on an escorted tour of historic landmarks. Itinerary will include Independence Hall, the Betsy Ross House, Congress Hall, Thomas Jefferson's home, Carpenter's Hall, Elfreth's Alley and many other landmarks.

Wednesday, May 5: (1:15 p.m.) Motor buses will leave Bellevue-Stratford Hotel for a conducted tour of Franklin Institute. A special program has been arranged at Fels Planetarium. Buses will return to the hotel by 4:30 p.m.

Thursday, May 6: (10 a.m.) Motor buses will leave Bellevue-Stratford Hotel, passing through Fairmount Park, viewing Washington Monument, Lemon Hill, General Grant's log cabin at City Point, Va., William Penn House. Enroute to Valley Forge the itinerary will include St. Charles Seminary, Haverford College, Bryn Mawr College, Rosemont, St. Davids', Wayne and Stratford. Luncheon has been arranged at Valley Forge Inn and a tour of the historic grounds is planned. Buses will arrive at Bellevue-Stratford Hotel by 4 p.m.

Friday, May 7: Banquet—Bellevue-Stratford Hotel.

eyes that stopped the thermometer at 1250°f

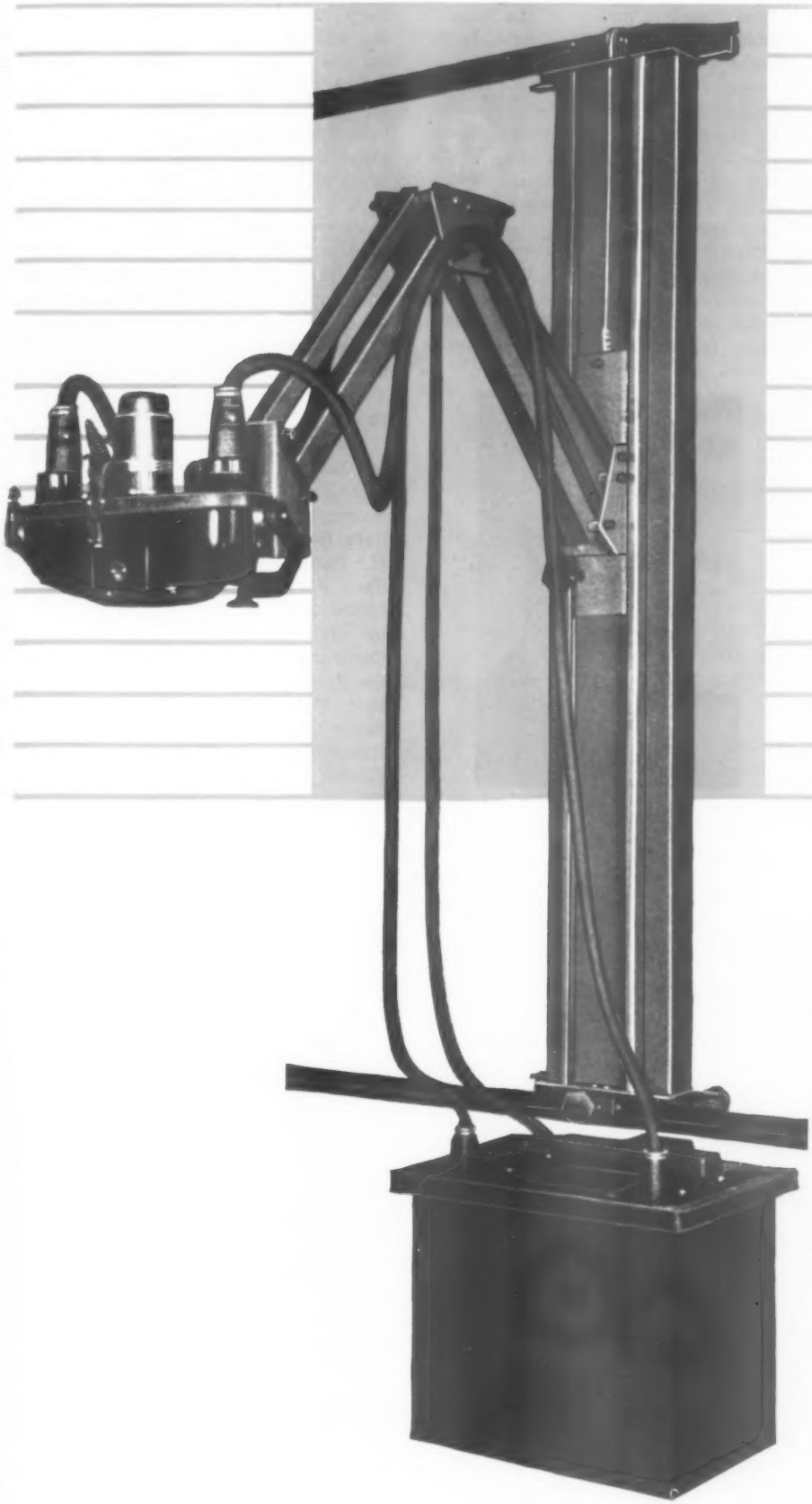
THE castings *looked* good. But machining told a story of irregularities. For every 100 castings delivered by the foundry, 45 came back "REJECTED." Costs skyrocketed. Shipping schedules bogged down.

What was wrong? The chief metallurgist thought he knew: enlarged grain size and porosity caused by imperfect pouring temperatures. But how prove it to management? And how find the perfect temperature?

Experimental melts were poured at 1250°, 1350°, 1450° and 1550° F — and the castings then checked by the foundry's General Electric Industrial X-Ray unit. On three of the films, a peppering of dark spots. Only the melt poured at 1250° showed a uniformly fine grain.

The radiographs were convincing. Management set a standard pouring temperature — 1250° F. Rejections dropped to less than 15 per cent. Monthly acceptances grew by 200,000 pounds. The General Electric Industrial X-Ray unit almost paid for itself on the first job.

In its ability to locate defects, develop better techniques, improve designs, General Electric Industrial X-Ray is an indispensable part of plant equipment. There's a good chance that industrial x-ray can be used profitably in your business. Why not talk it over with a General Electric X-Ray engineer? Write or wire. General Electric X-Ray Corporation, Dept. E-37, 4855 McGeoch Ave., Milwaukee 14, Wisc.



Industrial x-ray is not new. Industry already is better off by millions of dollars because of it. But many of its applications are new—and the product of General Electric X-Ray Corporation's pioneering and leadership.

Spectacular recent development is the General Electric million-volt industrial x-ray unit (not illustrated). It probes welds and castings up to 7 inches thick, trims inspection time by as much as 99%.

There are other G-E industrial units for light metal castings, packaged goods and small assemblies; each specially fitted to specific industrial needs.

And, additionally, there's analysis by *diffraction* in which the composition and characteristics of materials can be studied from patterns—rather than images—produced on films by diffracted x-radiation. Savings to industry with this equipment alone mount up to millions of dollars.

GENERAL ELECTRIC X-RAY CORPORATION

• General Electric X-Ray Corporation manufactures and distributes x-ray apparatus for industrial, dental and medical use; electromedical apparatus; x-ray and electromedical supplies and accessories.

(*Concluded from page 163*)

Wilkening Mfg. Co., is co-chairman. Also on the committee are Stanley Kirn, president, M. L. Kirn & Bros., and Edwin A. Zeeb, assistant foundry foreman, Dodge Steel Co.

Subjects of the sand and quality control lectures correspond, in the order of their scheduling, with the division interest breakdown of the technical program. AFA divisions have planned their individual activities to permit delegates to participate in those of their particular interest in the minimum number of days.

Aluminum and magnesium, brass-bronze, educational and malleable meetings are set for Monday and Tuesday; pattern, Tuesday and Wednesday; sand, Wednesday and Thursday; gray iron and steel, Thursday and Friday.

To Present Foreign Papers

Included on the division programs are four technical papers from abroad. Brass and Bronze Division will present the exchange paper of the Institute of Australian Foundrymen, "The Technology of Copper-Lead Alloys," by R. W. K. Honeycombe, formerly of the Council of Scientific and Industrial Research, Melbourne. William Ball, Jr., superintendent, Magnus Brass Division, National Lead Co., Cincinnati, will read the paper at a morning session, Tuesday.

Gray Iron Division will sponsor the annual exchange paper of the Institute of British Foundrymen, a highlight of AFA meetings since 1921, to be presented Thursday morning: "Contraction and Distortion in Ferrous Castings," by E. Longden, works manager, P. R. Jackson & Co. Ltd., Manchester, England. "Production of Nodular Graphite Structure in Gray Cast Iron," by H. Morrogh, British Cast Iron Research Association, Alvechurch, England, is to be presented Friday morning, also under sponsorship of the gray iron group.

Exchange paper of the French Foundry Technical Association, "Influence of Chromium on the Graphitization of White Cast Iron," by Gabriel Joly, head of cast iron metallurgy at the Foundry Industry Technical Center, Paris, is scheduled by the Malleable Division for Monday morning, and will be read by C. O. Burgess, Union Carbide & Carbon Corp. research laboratories, Niagara Falls, N. Y.

AFA general interest committees offer discussions of foundry mechanization and heat transfer, in addition to the programs already mentioned. "Modernization of the 'Small' Foundry," by Lester B. Knight, L. B. Knight & Associates, Chicago, is scheduled by the Plant and Plant Equipment Committee for its meeting Tuesday evening, and the Heat Transfer Committee will offer a report of its investigations, comprising four technical papers, Tuesday afternoon.

Annual business meeting of the association will be held Wednesday morning; annual banquet, climaxing the 52nd annual gathering, Friday. Other traditional events: Chapter officers and directors dinner, Canadian dinner, and Alumni dinner are scheduled for Tuesday, Wednesday and Thursday, respectively.

DR. KARL T. COMPTON
President, Massachusetts Institute of Technology, who will be the principal speaker at the AFA annual banquet

The president's annual address, by Max Kuniansky, vice president-general manager of Lynchburg (Va.) Foundry Co.; election of officers and directors; presentation of prizes to first-place winners in the annual apprentice contest, and the Charles Edgar Hoyt Annual Lecture, will be features of the business session.

William B. Wallis, president of Pittsburgh (Pa.) Lectromelt Furnace Corp., AFA's present vice president will be named to head the 10,000-member society in 1948-49, and Edwin W. Horlebein, president, Gibson & Kirk Co., Baltimore, who has served as a director since 1945, will succeed Mr. Wallis as vice president.

To be elected directors for 1948-51 are Thomas H. Benners, Jr., managing partner, T. H. Benners & Co., Birmingham; Norman J. Dunbeck, vice president, Eastern Clay Products Co., Jackson, O.; Alfred M. Fulton, vice president, Northern Malleable Iron Co., St. Paul; Robert R. Gregg, foundry manager, Reliance Regulator Corp., Alhambra, Calif., and Victor E. Zang, vice president, Unitcast Corp., Toledo, O. President Kuniansky will be elected a director to serve for one year.

Charles E. Nelson, technical director of the magnesium division, Dow Chemical Co., Midland, Mich., will present the Hoyt lecture, "Control of Grain Size in Magnesium Castings."

Vice President Wallis will preside at the dinner gathering of officers and directors of AFA's 42 local chapters.

Conferral of AFA gold medals, and the address of Dr. Karl T. Compton, president, Massachusetts Institute of Technology, will be the highlight of the banquet.

President Kuniansky will preside as James L. Wick, Jr., president-treasurer of Falcon Bronze Co., Youngstown, Ohio, presents the William H. McFadden award to Egbert H. Ballard of Swampscott, Mass.; Fred J. Walls the John A. Penton medal to R. G. McElwee, iron foundry division manager of Vanadium Corp. of America, Detroit; and Walter L. Seelbach, president of Superior Foundry Inc., Cleveland, the Peter L. Simpson medal to Peter E. Rentschler, president-treasurer of Hamilton (Ohio) Foundry & Machine Co.

Dr. Compton, internationally-famed scientist, educator and administrator, will speak on "Team Play of Hand and Brain."

Book Review

Industrial Applications of Infrared, by James Doyle Hall, cloth, 201 pages, 6 x 9 in., published by McGraw-Hill Book Co. Inc., New York. Price $3.50.

Increasing interest in the use of infrared lamps for a variety of heat applications prompted the author to prepare a nontechnical reference book on the use of infrared lamps.

Although heat formulas and theoretical calculations are useful in considering the application of radiant heat, the author believes that in many cases data obtained from actual tests or from the experience of others are even more helpful. With this thought in mind, he has placed emphasis on the practical rather than the theoretical aspects of the subject. Simple test procedures are outlined, and data obtained from a number of sources are used.

The variety of infrared installations illustrated and described in the book not only indicate the solution to specific heating problems but also suggest additional uses of radiant heat to the reader.

VOLCLAY BENTONITE

NEWS LETTER No. 9

REPORTING NEWS AND DEVELOPMENTS IN THE FOUNDRY USE OF BENTONITE

SCABBING

Scabbing is the breaking away of a portion or slab of the molding sand when hot metal enters the mold. The broken away portion of the sand adheres to the metal or is absorbed into it.

It is identified as a rough, slightly raised surface blemish, crusted over by a thin, porous layer of metal under which is a honeycomb or cavity that usually contains a layer of sand. The defect is common to thin-walled portions of the casting.

Some of the old time molders attribute scabbing to insufficient local ramming of the mold whereby the weaker portion breaks away. Other old timers say it is due to faulty venting, caused by a part of the mold being wet or rammed too hard or by agitation of the metal which left a solid mass of sand and metal at that spot.

The difference in the two opinions lies in the fact that some of the scabs appear to be solid, whereas others appear to be hollow. In ceramics, the word "scab" would probably be referred to as "spalling" which usually occurs with variations of volume change and thermal heat shock.

Improper heating at the mold cavity in-gates may be the chief reason for the difference in thermal expansion of the sand. Hard or uneven ramming can bring about scabbing as can improper gating and pouring at temperatures that are too high.

It is quite true that mold gases and vapors cannot penetrate wet or tight sand, and by detouring around this portion of sand, the vapor accumulates behind and thus forces the scab. Poor grain distribution or too-uniform sand encourages high sand expansion which results in scabs. Other causes of scabbing are low permeability, too much moisture, and excessive dry and hot strengths.

THE CHIEF SOURCE OF SCABS IS HIGH SAND EXPANSION. FIVE STAR Wood Flour overcomes sand expansion. As little as 1% insures against scabs. Write for additional data on FIVE STAR Wood Flour.

AMERICAN COLLOID COMPANY

363 WEST SUPERIOR STREET • CHICAGO 10, ILLINOIS

Producers of Volclay and Panther Creek Bentonite

PLANT VISITATIONS

Scheduled for AFA Convention

PLANT Visitation Committee of the Philadelphia Chapter, AFA, has arranged for visitors' inspection of a well diversified group of foundries during the Philadelphia convention. Plants of the area handling a variety of ferrous and nonferrous casting work are included in the list of foundries which will be open for visits. The committee, headed by C. W. Mooney Jr., Olney Foundry Division, Link-Belt Co., will maintain a plant visitation booth at AFA Convention Headquarters in Convention Hall, where visitors may make inquiries and arrangements concerning inspection trips.

Following is a brief summary of the plants which will be open to those attending the convention, and the type of product.

Florence Pipe Foundry & Machine Co., Florence, N. J.:

Products—Sand spun centrifugally cast, iron pipe, 4 to 10 in. diameter in 16-ft lengths, 12 to 30 in. diameter in 16 or 20-ft lengths. Daily capacity 300 tons, plus. Pipe fittings, hydrant and valve castings, hydraulic machinery castings and general castings 2 to 25,000 lb. The plant also houses a machine shop, pattern shop and brass foundry.

United States Pipe & Foundry Co., Burlington, N. J.:

Products — Super-deLavaud cast iron pipe, centrifugally cast 3 to 24-in. diameter pipe cast in metal molds in 12-ft and 18-ft lengths. Daily capacity 450 tons. Stainless steel tubing, piston rings, cast iron rolls, dual metal castings.

Bus transportation to above two plants available Tuesday, May 4, and Thursday, May 6, leaving Convention Hall about 10 a.m., returning about 4:30 p.m. Luncheon at plants arranged by the companies. Daily limit, 100 per trip, visting one plant in the morning, and the other in the afternoon.

Eastern Malleable Iron Co., Wilmington, Del.:

Open May 5 and 6, beginning at 1 p.m. Pennsylvania Railroad to Wilmington, where transportation will be arranged from station to foundry.

Products—Malleable and pearlitic malleable iron castings, both small and large. Company specializes in heavy-duty truck castings such as rear axle housings, covers, etc. Melted in air furnaces, annealed in radiant tube gas-fired furnaces and electric furnaces. Carbon steel castings; steel produced by converter process.

Dodge Steel Co., Tacony, Philadelphia:

Open May 3, 4 and 5 from 9 to 11 a.m.; May 6 from 2 to 4 p.m. May be reached by subway, surface car or taxi, a distance of 12½ miles.

Products—Jobbing steel foundry, producing carbon and low-alloy steel castings with an average weight of 20 lb. Melting done in acid-lined electric furnaces.

Crucible Steel Casting Co., Lansdowne, Pa.:

Open May 3-6 inclusive, from 1 to 3 p.m. May be reached by subway or taxi.

Main bay of gray iron department, Philadelphia Naval Shipyard foundry, one of the plants listed for visitation during the AFA convention

Products—Jobbing steel foundry. Electric furnace steel.

General Steel Castings Corp., Eddystone, Pa.:

Open May 5, 6 and 7, at 2 p.m. Groups limited to 75 each. May be reached by Pennsylvania surburban train to either Eddystone or Chester, thence by bus or taxi.

Products—Large steel castings for railroads and other industries, such as locomotive frames, car trucks, turbine castings, etc. Large machine shop.

Philadelphia Naval Shipyard, Philadelphia:

Open May 5 only, 9:30 a.m. to 4 p.m. May be reached by surface line or bus. Conducted tours through the yard including naval aircraft factory, ships, shops and drydocks.

Products—This yard has a foundry producing all ferrous and nonferrous castings except magnesium and malleable iron. The iron foundry has a capacity of 100 tons per day and can pour castings to 35 tons. Steel foundry has a daily capacity of 25 tons and can pour castings to 16 tons. Nonferrous foundry has a daily capacity of 82 tons and pours castings to 50 tons.

Philadelphia Bronze & Brass Corp., Philadelphia:

Open May 3-7, inclusive, 10 a.m.-4 p.m. May be reached by taxi or trolley car. Visitors will be accommodated as they present themselves.

Products — Nonferrous jobbing foundry, producing castings from 1 oz to 5000 lb in practically every nonferrous alloy, including nickel, nickel alloys, pure copper and age-hardened copper alloys.

North American Smelting Co., Philadelphia:

Note: Visitation will be to the Wilmington, Del., plant only. Open May 3-7, inclusive. Transportation will be provided by private cars for groups of 4 or 5.

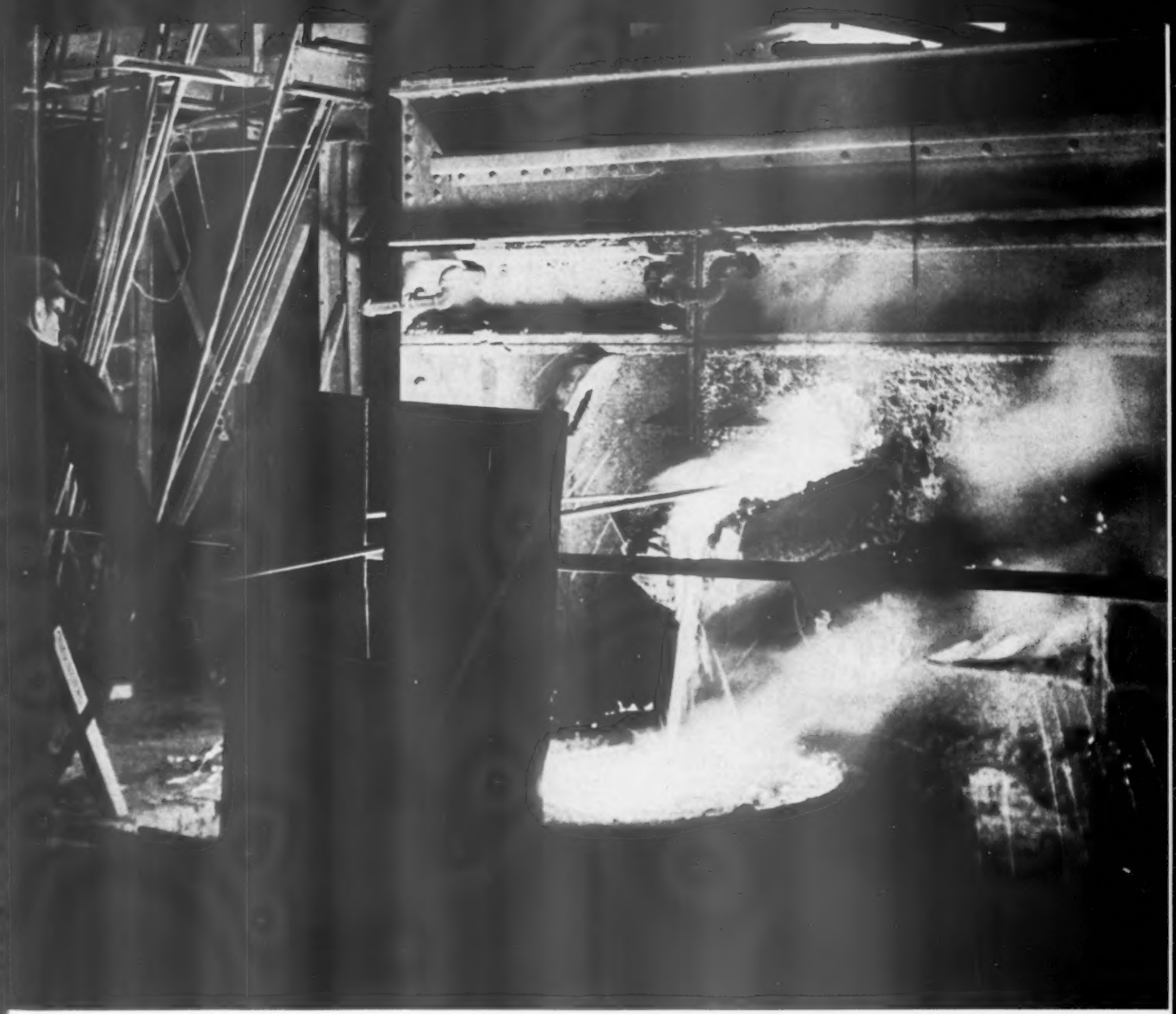
Products—Production of copper-base alloys in rotary furnaces for foundry use. Latest type equipment for handling hot metal and scrap.

Olney Foundry Division, Link-Belt Co., Philadelphia:

Open May 4-7, inclusive, 10 to 2 p.m. May be reached by surface lines or bus. Groups handled as they arrive.

Products—Gray iron, white iron chilled iron and high-alloy iron castings. Mechanized jobbing foundry

(*Concluded on page* 176)



Highest Quality Steels
MADE WITH VANCORAM FERRO VANADIUM

The high quality of Vancoram Ferro Vanadium, consistent from lot to lot, assures the steelmaker closer control during production and a finished product of unexcelled microstructure and physical properties. The alloy is produced in the following grades to meet the requirements of various products and manufacturing technics:

	Typical Composition
GRADE "A" *(Open Hearth)*	Vanadium . . . 35-40% Silicon . . . . max. 12% Carbon . . max. 3.50%
GRADE "B" *(Crucible)*	Vanadium . . . 35-45% Silicon . . . max. 3.50% Carbon . . max. 0.50%
GRADE "C" *(Primos)*	Vanadium . . . 35-45% Silicon . . . max. 1.25% Carbon . . max. 0.20%
HIGH V GRADES	Vanadium . . . 50-55% 60-65% 70-80% Silicon . . . . . Low Carbon . . . . . Low

Large stocks are carried of all grades of alloys, and they can be supplied in any of the standard lump, crushed, or mesh sizes.

Our metallurgists will be glad to assist you in the application of Vancoram Ferro Vanadium to meet your specific requirements.

MAKERS OF FERRO ALLOYS VANCORAM *CHEMICALS AND METALS*

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

(*Concluded from page* 174)

producing castings from ounces to 20,000 lb. Melting is done in cupola furnaces.

Murrell Dobbins Vocational-Technical School, Philadelphia:

Visitors desiring to inspect this excellent technical school should inquire at plant visitation booth in AFA headquarters, Convention Hall.

A NEW APPROACH TO INSTRUCTION

(*Continued from page* 141)

the summer of 1946 and it was natural that he should embody in the course those aims and objectives which he had gained from long experience in the foundry field, first as an instructor in foundry practice and later on the national office staff of the American Foundrymen's Association.

An alumnus of the University of Illinois, receiving the degree of B.S. in Vocational Education in 1925, Mr. Kennedy entered the university in Urbana, Ill., as a student in 1909. The following year he became a member of the teaching staff, a post he continued until 1924, by which time he had become assistant professor in charge of foundry practice. Meanwhile, beginning in 1921, he had been serving as assistant secretary of the American Foundrymen's Association. Relinquishing his duties at the university in 1924, Mr. Kennedy moved to the association's national office in Chicago and assumed the position of technical secretary. In 1943, he was elected secretary and in this capacity continued to promote and encourage chapter organization.

In 1945, in recognition of his long and faithful service in the association, the membership and the industry, Mr. Kennedy was relieved of his increasing administrative burdens and made secretary emeritus. Few men in the foundry field have merited the esteem in which Bob Kennedy is held, because of his unselfish and kindly devotion to committee work, convention programs, chapter organization, and the encouragement of young men in the industry. It was those qualities that earned for him the Joseph S. Seaman Gold Medal of the AFA, an award symbolizing "Kindliness," presented to him at the association's annual business meeting in 1945.

Mr. Cramer, who joined the Navy Pier Branch staff in September, 1947, to teach pattern design, graduated from the University of Illinois, in 1926, in mechanical engineering. For 21 years he was associated with the American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill., serving the latter part of this period as superintendent of the alloy foundry.

Mr. Schroeder, who also became a member of the Navy Pier Branch staff in September, 1947, was an instructor in foundry practice at the University of Illinois from 1920 to 1926. Since that time he was associated with the Chicago public schools, first at Crane Technical High Schol and later at Washburne Trade School as foundry instructor.

The *Cast Metals Handbook*, third edition (1944), published by the American Foundrymen's Association, is used as a textbook in both the foundry and pattern design courses. For pattern design, however, the chief text book is *Pattern Design* by Hall and Kiley.

It is interesting to note that in the pattern design course, the students do not actually make patterns. Instead, patterns and coreboxes are laid out on the drafting board. Two hours each week are devoted to lectures and three hours to layout and laboratory work. This course also includes outlines on centrifugal castings, die castings and precision investment castings, with lectures on the applications on these specialized methods of castings production.

From the opening of Navy Pier Branch in 1946 until April, 1947, installation of equipment in the foundry laboratory was not complete because of delays encountered in getting delivery of the equipment, consequently during that period arrangements were worked out whereby students used the foundry facilities of Washburne Trade School in Chicago.

Now fully equipped, the foundry department of the university comprises three main sections, namely, the sand laboratory, the coreroom and foundry, and the pattern design room, aggregating a total of 5060 square feet.

The sand laboratory has complete sand testing equipment, including that necessary for making sinter, permeability, strength, fineness and moisture tests.

Coreroom has a muller, a stock core machine and a gas-fired, thermostatically-controlled core oven.

Molding equipment in the foundry includes three handpower machines —a stripper plate, a squeezer and a rollover pattern draw; two air power machines —a jolt-ram rollover pattern draw and a jolt-squeeze; 16 molding benches, and some floor molding equipment. Other equipment available is a muller, a sand aerator, an electric power sand riddle, a short section of roller conveyor to illustrate the principle of mold conveyorization, a cabinet shot blast machine and several grinders.

Melting equipment includes a 3-phase electric arc furnace of 250-300 pounds capacity per hour for melting iron and steel, and a No. 30 crucible gas-fired stationary furnace for melting aluminum and bronze.

Meeting Calendar

May 3-7—American Foundrymen's Association, annual convention and Foundry Show, Philadelphia.

May 27-29—Society for Experimental Stress Analysis, annual meeting, Pittsburgh.

May 30-June 4—American Society of Mechanical Engineers, semi-annual meeting, Milwaukee.

June 3-5—Steel Founders' Society of America, Technical and Operating Conference, Cleveland.

June 10-11—Malleable Founders' Society, annual meeting, Hot Springs, Va.

June 21-25—American Society for Testing Materials, annual meeting, Detroit.

Oct. 14-15-16—Foundry Equipment Manufacturers Association, annual meeting, White Sulphur Springs, W. Va.

Oct. 25-29—National Metal Congress and Exposition, Philadelphia.

Nov. 11-13—Meehanite casting manufacturers, annual meeting, Pittsburgh.

Nov. 18-19—National Founders Association, annual meeting.

British Foundrymen To Meet June 8-11

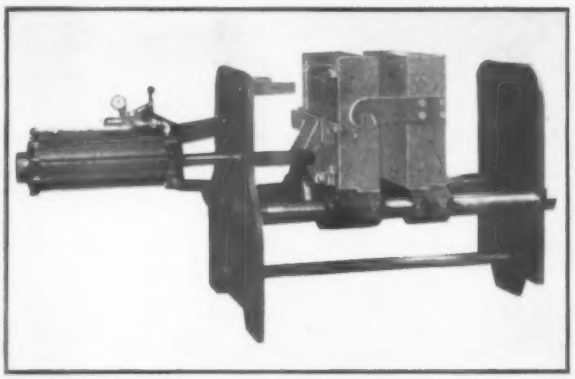
Institute of British Foundrymen will hold its annual conference in London, June 8 to 11. The first day will be devoted to council and committee meetings. Included among the technical papers to be presented is the Edward Williams Lecture, which will be delivered by Dr. Harry A. Schwartz, National Malleable & Steel Castings Co., Cleveland. Title of his lecture will be "Some Solved and Unsolved Problems in the Metallurgy of Blackheart Malleable."

Apprentice Credit

Bureau of Apprenticeship, U. S. Department of Labor, Washington 25, has published a booklet entitled "Apprenticeship Credit for Previous Experience." Credit for an apprentice's previous experience in a trade while in military service or in civilian occupations is discussed in detail. Principles which should get the granting of credit are described, as well as suggested procedures which might be employed for evaluating past experience and allowing appropriate credit.

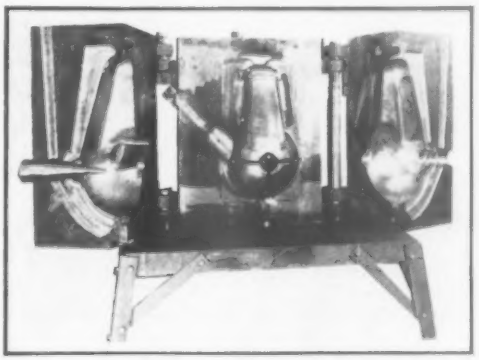
WE SPECIALIZE IN..

PERMANENT MOLDS FOR ALUMINUM CASTINGS



This method of making aluminum castings is rapidly becoming more popular because it is based on three sound economic reasons. Aluminum castings produced in permanent molds are cleaner and better looking; they have a closer dimensional accuracy; they can be produced more economically.

For suitable production castings, pneumatic permanent mold equipment gives you even greater economy and also speeds production. The main advantage of this kind of mold equipment is that the interchangeable custom built mold blocks can be quickly and easily bolted to this air operated table. This interchangeable feature greatly reduces future mold costs. The table itself is durable and simple in design and can be used continuously.



For certain types of castings depending on the production, size, and weight, the manually operated is most economical.

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We are also equipped to make all types of wood and metal patterns in accordance with the specifications of your foundry. Precision patterns and models are a specialty.

Your molds and pattern equipment, if properly constructed for the purpose they are to be used, can save you up to 25% on casting cost. On high production items this can amount to even greater savings.

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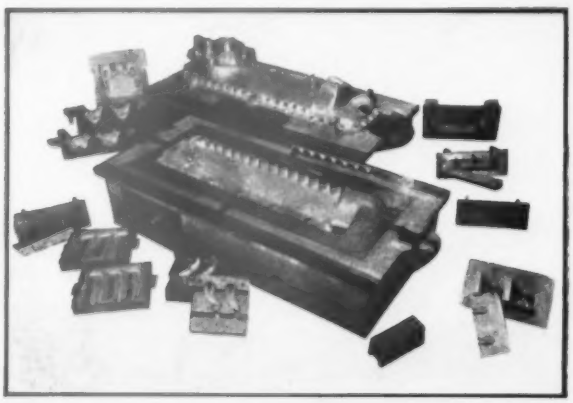
Send us your blueprints or sample castings for quotation.



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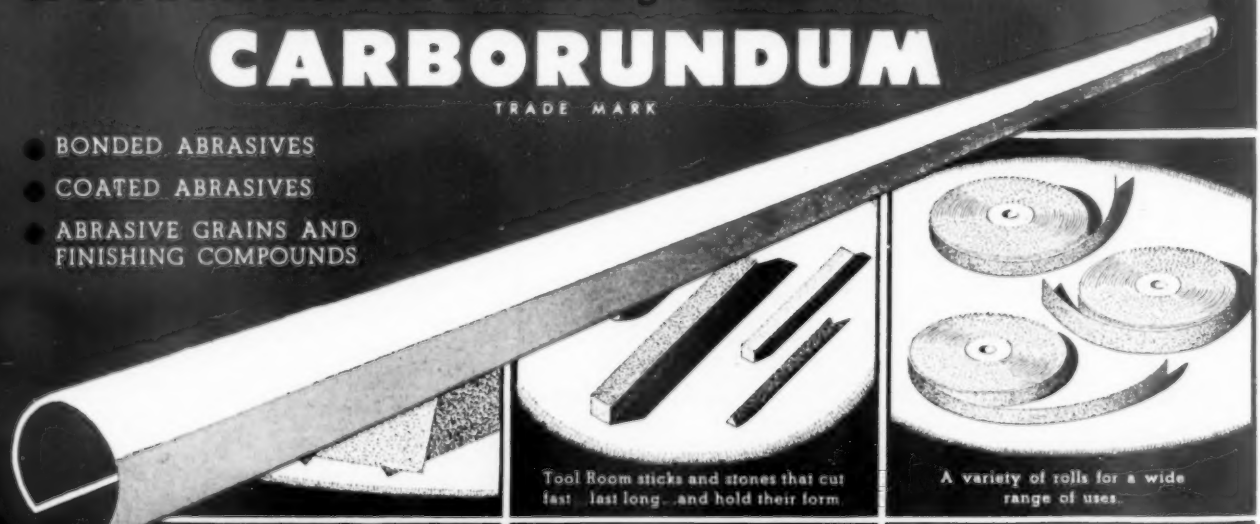

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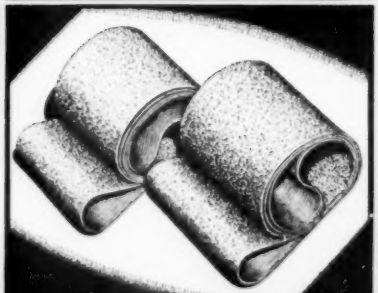
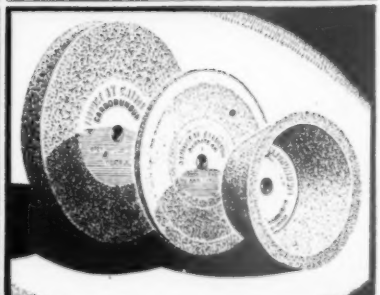


A Coated Abrasive for every sanding and finishing condition.



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CASTING APPLICATIONS DISCUSSED

At Chicago Technical Conference

By ERLE F. ROSS
Chicago Editor
THE FOUNDRY

"WHAT METALS for Your Castings?" was the question to which the Chicago Chapter, American Foundrymen's Association, sought to provide the answer in two sessions it sponsored on Mar. 24 during the three-day Chicago Technical Conference of Chicago Technical Societies Council. The conference and its affiliated Chicago Production Show, held at the Stevens Hotel, is an annual event springing from the War Production conferences which the council sponsored during the war.

The two foundry sessions, embracing four papers, one each on nonferrous, gray iron, steel and malleable, were conducted to appeal to and benefit purchasers and users of castings. The papers, therefore, were prepared so as to set forth clearly the engineering properties of the various types of castings and the fields and services for which the castings are best suited. The program was arranged under direction of Fred B. Skeates, foundry superintendent, Link-Belt Co., Chicago, and president, Chicago Chapter, AFA. Alfred W. Gregg, executive engineer, Equipment Division, Whiting Corp., Harvey, Ill., was honorary chairman.

Advantages and use of nonferrous metals for castings were discussed in a comprehensive paper by Herman L. Smith, chief metallurgist, Federated Metals Division, American Smelting & Refining Co., Pittsburgh. The speaker divided his comments into three parts, covering the three main classifications of nonferrous castings, namely, the aluminum alloys, copper-base alloys, and white-base alloys.

Aluminum alloys have exhibited phenomenal increase in use in recent years, reason being that aluminum is one of the few metals to decrease in price, to expand many times over prewar production, has a wide range of chemical and mechanical properties, and has lightness to decrease deadweight and inertia.

According to Mr. Smith, tensile strength of aluminum alloys extends from 12,000 to 35,000 psi. The alloys have wide range of yield and ultimate strengths, have excellent corrosion resistance, and can be given permanent coloring, also electroplate well. With new technique, chrome plating shows possibilities. The metal dissipates heat with ease, has good electrical properties, and has high reflectivity for insulating applications. Aluminum alloys can be cast by all of the customary techniques, and has possibilities in powder metallurgy. The alloys can be substituted for gray iron and malleable, but the right alloy must be selected.

Alloys Have Unique Properties

Copper-base alloys, continued Mr. Smith, have unique properties, including high strength, excellent resistance to corrosion, heat and abrasion, good castability, and many others. Fact that they have not been too widely used probably is because in the early days there were too many specifications and types, making for a confused situation. Since 1930, however, the speaker pointed out, the Brass and Bronze Ingot Institute, technical societies and manufacturers, have found that about 25 alloys cover the field, these falling into 9 main types.

White base alloys are divided into three groups comprising bearing metals, solder metals and type metals. Most important of these is the bearing metal group. These alloys contain tin, which, because of high price and shortage induced by the war, has been replaced by lead, an element also undergoing price increase; nevertheless cost of the alloys have been reduced. Because of improvements in the alloys, Mr. Smith stressed that bearings can be made appreciably smaller, giving further cost reduction to the user and conserves material. Five or six alloys cover all bearing applications required by industry.

The advantage and use of gray iron as an engineering material was covered in a most thorough manner by E. B. Sherwin, president, Chicago Hardware Foundry Co., North Chicago, Ill., and R. D. Phelps Jr., secretary, Francis & Nygren Foundry Co., Chicago, the former presenting the paper and the latter serving as discussion leader. The presentation treated the subject on a basis of various gray irons as covered by such recog-

(*Concluded on page* 186)

New Cupola Has Record Height

INSTALLATION of what is said to be the highest cupola in the nation has just been completed at the United States Radiator Corp. plant in Geneva, N. Y. Rising to a height of 115 ft from base to the top of the stack, the new cupola was installed by the Modern Equipment Co., Port Washington, Wis. It is approximately as tall as a ten-story building.

The new cupola installation is equipped with a spark arrester to prevent sparks from flying over surrounding buildings, a fly ash remover to collect solid particles from gases coming from the stack, and includes a skip hoist for loading and elevating charges into the cupola.

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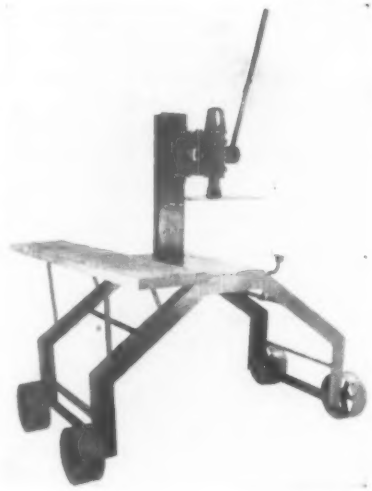

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* Equipped with knee valves for operating jolt and vibrator, hand-operated squeeze valve. A dependable unit, moderately-priced.

PIONEER
Manufacturing Company
MILWAUKEE (West Allis) WIS.

(*Concluded from page* 184)
nized specification writing bodies as ASTM and SAE.

Rather than attempting to give positive statements as to when to use gray iron, the speaker approached the problem from the standpoint of explaining the properties of gray iron, comparing these with other cast engineering materials in common use. In addition, frequent examples of the application of gray iron were cited.

Among the properties which Mr. Sherwin discussed were tensile strength, strength in compression, yield point, ductility, wear resistance, oxidation and heat resistance, damping capacity, thermal conductivity, impact loading, shear strength, endurance limit, transverse strength, and corrosion resistance.

Designer and Foundryman Co-operate

The speaker stressed the need for co-operation between the designer and foundryman. He said: "It is important to remember that although the designer has greater liberality of design with gray iron, than with other ferrous castings, suggestions from the practical foundryman often can result in definite economies. Attention also is called to the importance of calling in specialists in production of certain types of gray iron when critical problems are involved. It should be remembered, however, that any reputable foundryman can reproduce or duplicate most specification iron now in existence, whether produced under trade name or not.

"It should be impressed upon designers that under most circumstances the latter should determine the properties he desires and leave the chemical analysis of the iron to the foundryman to meet the desired specifications.

"By way of conclusion, in addition to such advantages as excellent castability, good machinability, good wear resistance, high damping capacity, and high compressive strength, production figures compared with other cast metals show gray iron to be the most widely used and one of the best engineering materials available today."

Discussion of this paper was extremely active. Points covered were inoculation, alloy additions, tensile strengths, heat treatment, and the effect of inferior quality of pig iron, coke and scrap on quality of castings.

Advantages and use of steel castings were discussed in a paper prepared by J. A. Rassenfoss, research metallurgist, American Steel Foundries, East Chicago, Ind., and presented for him by E. W. Ganslein, research metallurgist, same company. C. V. Nass, vice president, Pettibone Mulliken Corp., Chicago, presided and directed discussion.

The paper accented two main points concerning steel castings, namely, their wide range of uses and the fact it is possible to predetermine their stamina and efficiency by tests simulating the service to which they are to be subjected. Steel castings can be made in sizes ranging from ounces up to 200 tons. Emphasized by the author also was the important point that metal can be put into the casting where it is needed. Two methods of casting procedure were considered—static casting and centrifugal casting.

The paper was profusely illustrated with slides to show the wide variety of castings from smaller sizes to those used in the railroad industry and in ordnance, where rugged serviceability is a requisite. The slides gave proof that economy in manufacture can be achieved by making even the most complicated of highly-stressed parts from the steel castings.

Form One Price Castings

The audience appeared most impressed by the complicated shapes and sizes of steel castings. In discussion several people commented that the material and illustrations assembled by the author provided an excellent argument against propaganda for building heavy equipment with assemblies or weldments. It was obvious that use of one-piece steel castings can provide simplification as well as savings in cost.

J. H. Lansing, consulting engineer, Malleable Founders' Society, Cleveland, contributed the story on advantages and use of malleable castings. C. F. Lauenstein, chief metallurgist, Link-Belt Co., Indianapolis served as discussion leader.

It was the contention of the speaker that malleable castings offer economy in manufacture and efficiency in service. Malleable best serves the field in which the specifications are suitable. The largest field of use is automotive. Speaking of automotive, Mr. Lansing mentioned that some years ago Ford Motor Co. saved $1,120,000 in a year by replacing one car part, formerly machined from steel, with a malleable casting.

The speaker stated that many malleable castings are small, but for railroad and truck application they range up to 300 pounds. A characteristic of malleable iron, due to its temper carbon, is its high machinability. The material is basically corrosion resistant and for weathering applications takes a galvanized coating with ease and uniformity. A further and most important attribute is its great shock resistance. By means of numerous slides, the speaker illustrated the commonplace and special applications in which malleable iron castings find their greatest usefulness.

The Resourceful Hobo

By H. B. McDERMID

IN A SMALL Midwestern town, the local iron foundry owner was a noted wag, who loved a practical joke above all things. One day while buying a lot of scrap for his cupola he purchased at what seemed an attractive price, some twenty odd 12-in. globular cast iron shells. He soon found the joker in the price—the shells could not be melted as they were nor could they be commercially broken into sizes which would permit melting.

He gave them up as a loss, but also decided to have some fun with them. He was frequently approached by tramps looking for an odd job, so the practice grew up to give each new hobo a sledge, and to start him in at breaking up these shells. No one ever even cracked one of the thick-walled balls, so the foundry gang got a lot of fun guessing how long a new victim would last before quitting in disgust.

One bitter cold day a new man came after a job and was given the usual introduction to the pile of shells. He looked them over after a few blows, and noted that each had one hole, and one only, into its interior. Then he counted the total number of pieces and, coming back to the watching and mystified gang, braced the boss for a job price for breaking the whole lot. An agreement was speedily reached, and the gang prepared to see some real fun. The hobo merely went out and further mystified his watchers by digging out all the shells, placing them in a row and then walking off. Late in the day he reappeared and, borrowing a bucket, proceeded to fill each shell with water, and again disappeared. The following morning he appeared early and, to the boss' chagrin, found every shell burst in pieces from the expansion of the freezing water.

The boss paid off, but it was a long time before he heard the last of how a professional hobo easily got the better of him.

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- Foundry Mechanization
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- Industrial Engineering; Job Evaluation, Incentives

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FOUNDRY MODERNIZATION
Requires
SPECIALIZED ASSISTANCE
BY EXPERIENCED ENGINEERS

KNIGHT Services for Foundries...

- Foundry Engineering—The many complex problems confronting foundry owners and managers challenge the decision of any one man or group of men who have not had the opportunity to make similar decisions before. Knight engineers are thoroughly familiar with foundry problems and their economical practical solutions.
- Architectural Planning—Whether you need a revised architectural plan or the design of a complete new plant, Knight offers experienced service.
- Foundry Layout—An analysis of your foundry by Knight engineers will result in a new projected layout with rearranged existing facilities plus recommended new facilities and the comparative operation costs of the old and new layouts.
- Foundry Mechanization—After an analysis of your plant the Knight organization will specify equipment best suited for desired production and supply specifications to the foundry's acceptable suppliers for price quotations and delivery.
- Foundry Management—Several Knight engineers, with many years of management experience in various types and sizes of foundries, are particularly qualified to take over temporary management of your foundry or to work with you in ironing out management problems.
- Industrial Engineering; Job Evaluation, Incentives—General foundry practices must be as modern as the facilities. An efficiency survey of your plant by men of the Knight organization will result in specific recommendations for betterment of labor-management relations, establishment of fair wage incentives, standards and cost control which will pay management big dividends in increased production and profit.

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FOUNDRY Developments

By EDWIN BREMER

ACCORDING to C. O. Lundberg in a recent issue of *Grits and Grinds*, published by the Norton Co., Worcester, Mass., many laboratory workers are not aware that fine, short chips can easily be obtained when drilling steel specimens for chemical analysis. Standard drill usually is ground to 118° included angle, and produces long curly chips. However, by grinding the tip nearly flat, say to 160° included angle, fine chips are obtained. Increasing the drill speed and using a light pressure will produce even finer chips. Hence, with a flat ground drill and a little experimenting suitable chips may be obtained.

* * *

ZINC-BASE alloys represent a new bearing material which is more than a substitute, and therefore should receive engineering attention in the United States, according to a report on German research on the subject now available from the Office of Technical Services, Department of Commerce, Washington 25. Prepared by F. R. Hensel and W. M. Pollitzer, the report summarizes German investigations and practical experience, and presents test data. Practical German experience has shown that zinc-base bearings have applications in electric motors, narrow gage locomotives, street cars, cranes, crushers, harvesting machinery, machine tools and in small diesel engines. Compared to other bearing materials, zinc-base alloys show superior tensile and fatigue strengths and are harder. Thermal conductivity is better, coefficient of expansion is higher, and zinc alloys can be used as solid bearings due to high tensile strength at low temperatures. Centrifugal casting should be employed wherever possible since it produces a dense structure. Changing to zinc-base bearing alloys does not generally necessitate alterations in design, and they can be used as full round or split bearings. Pattern shrinkage common for gray iron and red brass can be used for zinc casting.

* * *

TEST report on centrifugal casting of the middle parts of crankcases at the Ruhrstahl Annener Gussstahlwerk, Germany, is available from the Office of Technical Services, Department of Commerce, Washington 25. The report (PB-79174, "Centrifugal Casting of Crankcase Middle Parts"; photostat $2, microfilm $1) states that sand molds were used and made in three sections. Bottom part formed one side of the casing, the cylindrical bores. Middle part formed the outside diameter of the casing with the clearance and cylinder bottom face. Upper part matched the bottom part and contained a down runner (sprue) through its axis leading to a basin. Upper and lower parts formed seven runners which joined the basin and gate with the various feet. Middle disk was cast solid. Runners at the foot of the lower part had a diameter of $\frac{5}{64}$-in. Corresponding upper runners were $\frac{5}{32}$-in. high and $\frac{5}{64}$-in. wide. Original thickness of the middle disk was $\frac{7}{64}$-in. and was not thickened or tapered to promote better metal-flow characteristics.

* * *

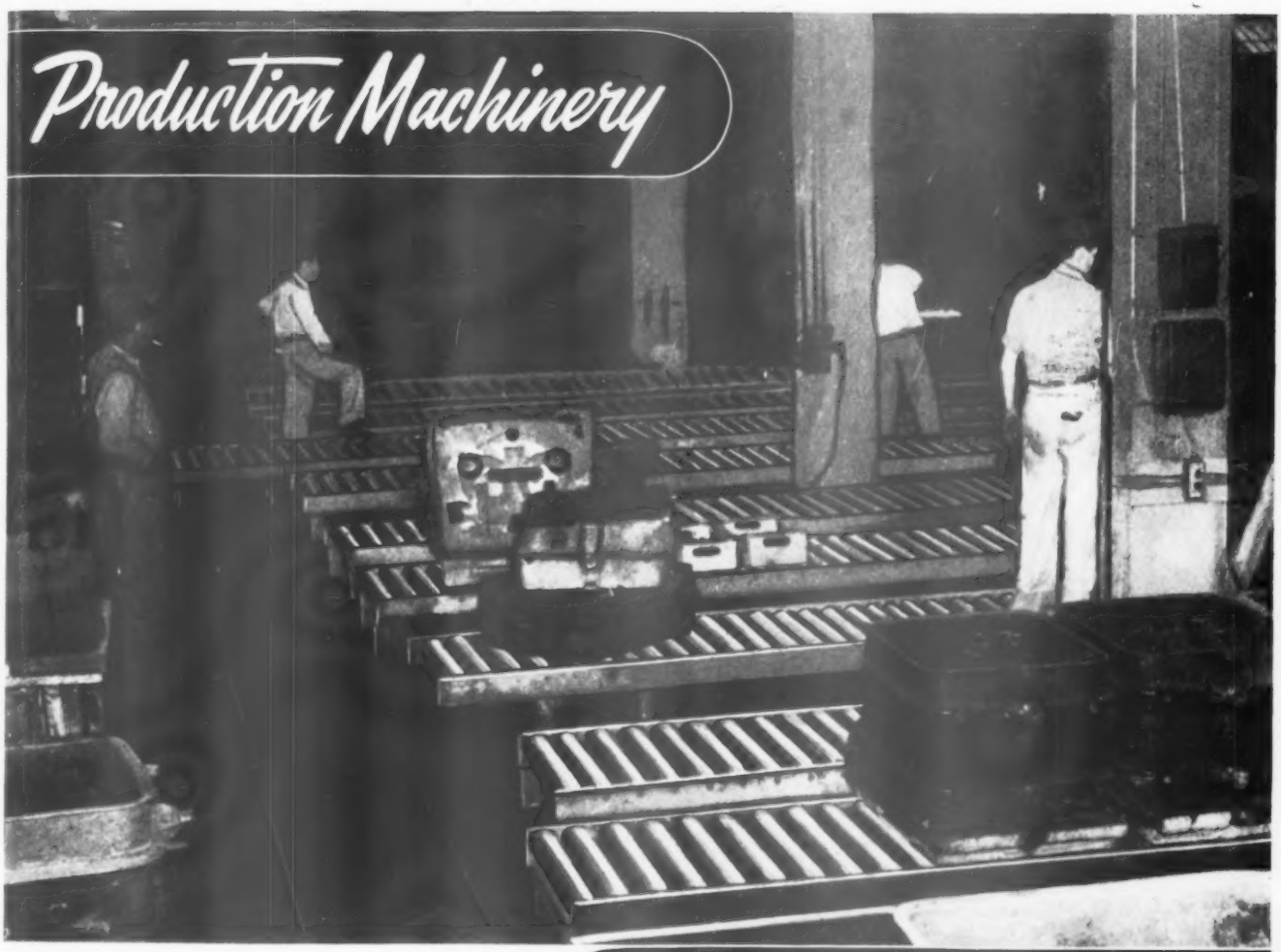
PAPER presented by M. F. Yarotsky, Carnegie-Illinois Steel Corp., at the recent National Open Hearth Steel Conference at Pittsburgh discussed experimentation at the South Works with use of oxygen and compressed air in the open-hearth furnace to determine their effect on furnace operation when used to promote flame development. Conclusions indicated by results to date are: Increased production rates over those obtained on the balance of the shop were realized in all experiments with higher firing rates provided the charging time for scrap was below 2 hr. Use of higher firing rates with or without compressed air or oxygen with protracted charging times or hot metal delays results in high fuel costs with little or no benefit in production. Use of oxygen or preheated compressed air introduced below the oil with double burners resulted in the highest production rates as measured by tons per melting hour. Economic advantage in use of oxygen over preheated compressed air for flame development when used with a double burner may be difficult to justify, since the differential was not too significant.

* * *

SPECTROGRAPHIC analytical method for determining the beryllium content of magnesium alloys has been developed by the materials laboratory, Army Air Forces, Wright Field, O., and described in report PB-85768 —"A Method of Spectrographic Analysis for Beryllium in Magnesium Alloys", available from the Office of Technical Services, Department of Commerce, Washington 25 (photostat and microfilm copies, 7 pp., $1 each).

* * *

CHROMATED protein coatings offering a convenient, inexpensive means of protecting metals—especially zinc, iron, brass and aluminum —during outdoor storage in mildly corrosive atmospheres, have been developed by Abner Brenner, Grace Riddell and Robert Seegmiller of the National Bureau of Standards. Protective value of such films is said to be somewhat better than that afforded by chemical surface treatments and is much superior to that of corrosion-inhibited oils and waxes. Principal constituents of chromated protein films are a corrosion inhibitor for the metal, a protein which acts as the vehicle for the inhibitor, a hardening agent, and a bactericide to prevent putrefaction of the protein. The chromate serves as the inhibitor and may act as the hardening agent and bactericide as well, although other media such as formaldehyde, tannins, etc., can be used as hardening agents. Two-step process of application usually most satisfactory consists of dipping the metal into an aqueous protein solution, and when that film is dry, it is immersed in an acidified chromate solution for ½ to 3 minutes, and allowed to dry without rinsing. Chromate solution contains 0.5 to 2 per cent chromic acid or 1 to 10 per cent dichromate of zinc, iron or nickel.



Logan Roller Conveyor lines simplify the handling of molds in this nationally known foundry. Molding machines are at left and transfer car on track in front of molding machines permits transfer of molds to any one of several conveyor lines. After assembling molds are pushed to pouring zone in bay at right.

not just auxiliary equipment

Just as time and work studies, and better utilization of floor space contribute to stepped-up production, so does "flowing" materials handling . . . through expertly engineered Logan Conveyors.

In hundreds of foundries Logan Conveyors are so closely dove-tailed with other equipment that they are an integral part of molding, pouring and machining operations. That's why well-planned Logan Conveyors increase production capacity and multiply foundry volume.

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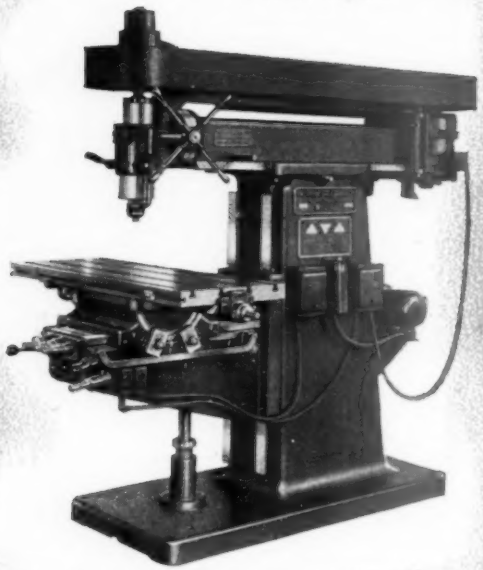

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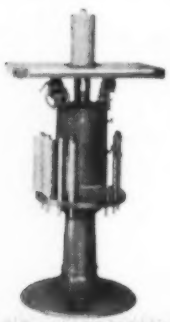
PATTERN PLATES



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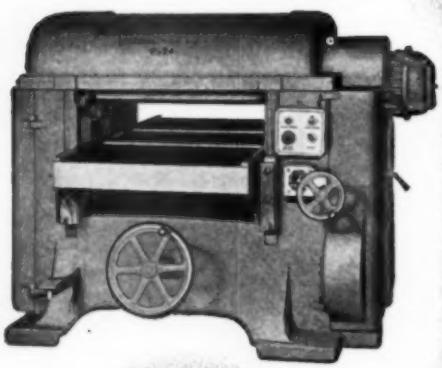
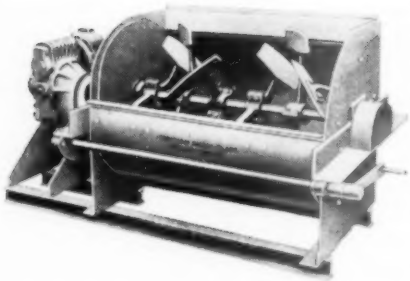


24" PLANER

CORE & MOLD SPRAYER



MULTI-BLADE MIXER

FOUNDRY STATISTICS

Index of Foundry Equipment Orders

(Net Orders Closed)

	New Equipment	Repairs	Total Sales
1946			
Oct.	407.1	672.0	469.2
Nov.	421.0	661.5	477.4
Dec.	379.0	600.3	430.9
1947			
Jan.	466.9	665.0	513.4
Feb.	472.5	682.9	521.9
Mar.	532.3	709.5	573.8
Apr.	445.9	727.9	512.1
May	525.9	623.0	548.6
June	658.9	620.7	649.9
July	426.1	565.3	458.7
Aug.	411.3	656.8	468.9
Sept.	393.1	657.7	455.1
Oct.	438.2	786.7	520.0
Nov.	286.1	643.1	370.1
Dec.	467.8	694.6	521.1

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Estimated Number of Foundry Wage Earners

Type Foundry	Jan. 1948	Dec. 1947	Jan. 1947
Gray Iron	84,200	83,900	86,200
Malleable Iron	28,000	27,800	25,100
Steel	49,900	49,400	50,500

Source: Bureau of Labor Statistics.

Castings Production

In Philadelphia Federal Reserve District

Type Foundry	Percentage Change From: Jan., 1948	Feb., 1947
Gray Iron	+ 2.6	— 1.0
Malleable Iron	+ 8.8	+38.3
Steel	+ 3.1	— 5.5
Nonferrous	+ 5.2	—20.1

Source: University of Pennsylvania.

Average Earnings and Hours of Foundry Workers

Type Foundry	Average Weekly Earnings Oct. 1947	Sept. 1947	Aug. 1947	Average Weekly Hours Oct. 1947	Sept. 1947	Aug. 1947
Gray Iron	57.77	57.67	53.77	41.9	42.1	40.3
Malleable Iron	58.13	55.93	51.68	41.2	40.3	37.7
Steel	57.72	56.56	54.71	40.7	39.9	39.1

Source: Bureau of Labor Statistics

—SHIPMENTS OF CASTINGS—

(Reported by Bureau of the Census)

Gray Iron Castings

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1946			
Oct.	1,077,838	626,273	2,952,705
Nov.	987,069	561,626	2,940,199
Dec.	909,195	514,415	2,979,658
TOTAL	10,269,657	6,102,246	.....
1947			
Jan.	1,077,820	632,789	3,021,141
Feb.	1,009,970	583,252	2,986,741
Mar.	1,089,828	633,844	2,979,326
Apr.	1,097,150	636,708	2,907,694
May	1,097,307	636,013	2,782,706
June	1,038,356	596,874	2,710,854
July	912,939	519,137	2,675,138
Aug.	951,859	550,961	2,631,273
Sept.	1,025,089	590,702	2,679,858
Oct.	1,154,192	654,426	2,668,781
Nov.	1,020,239	561,660	2,687,244
Dec.	1,066,211	587,933	2,782,236
TOTAL	12,540,960	7,181,299	.....
1948			
Jan.	1,064,335	584,238	2,802,685

* For sale only.

Steel Castings

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1946			
Oct.	137,304	98,265	384,082
Nov.	130,606	93,878	372,058
Dec.	123,907	88,136	362,787
TOTAL	1,432,049	1,043,358	.....
1947			
Jan.	139,029	101,140	365,476
Feb.	125,612	92,822	421,405
Mar.	134,909	99,701	434,865
Apr.	144,175	106,127	427,554
May	140,874	103,779	443,225
June	139,031	103,888	445,475
July	116,956	85,014	473,923
Aug.	120,405	88,719	478,649
Sept.	137,457	102,913	526,229
Oct.	148,358	111,288	497,344
Nov.	130,125	97,143	493,309
Dec.	148,124	110,970	489,364
TOTAL	1,625,055	1,203,504	.....
1948			
Jan.	141,068	108,282	491,745

* For sale only.

Malleable Iron Castings

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1946			
Oct.	79,207	46,477	280,972
Nov.	68,987	39,328	278,446
Dec.	68,314	39,327	267,661
TOTAL	752,028	452,355	.....
1947			
Jan.	75,898	42,414	259,764
Feb.	74,716	41,684	274,018
Mar.	76,614	43,488	280,724
Apr.	81,890	47,303	275,415
May	75,478	42,294	262,117
June	78,524	45,291	248,798
July	64,162	40,733	234,656
Aug.	62,404	38,165	229,735
Sept.	71,568	40,138	218,276
Oct.	83,979	47,673	210,695
Nov.	72,111	39,969	206,510
Dec.	77,757	44,042	202,408
TOTAL	895,054	513,228	.....
1948			
Jan.	77,744	45,808	205,759

* For sale only.

Aluminum Castings

(Thousands of pounds)

	Shipments Total	Shipments Sand	Shipments Perm. Mold	Unfilled *Orders
1946				
Nov.	35,635	13,192	15,440	138,270
Dec.	34,754	12,827	14,586	137,198
TOTAL	388,711	160,845	153,138	.....
1947				
Jan.	39,438	14,030	16,902	131,368
Feb.	35,904	12,936	15,148	128,999
Mar.	40,135	13,791	17,509	121,038
Apr.	39,438	13,633	16,605	112,926
May	37,400	13,646	14,514	112,548
June	32,986	11,775	13,105	102,758
July	30,197	10,095	11,739	101,370
Aug.	30,441	10,908	11,342	94,658
Sept.	35,877	12,228	14,146	94,637
Oct.	40,532	13,855	15,685	85,012
Nov.	34,683	11,428	13,558	83,975
Dec.	37,489	12,552	13,784	81,784
TOTAL	441,996	155,112	174,515	.....
1948				
Jan.	38,312	12,670	15,020	86,611

* For sale only.

Copper-base Alloy Castings

(Thousands of pounds)

	Shipments Total	Shipments Sand	Shipments Perm. Mold	Unfilled *Orders
1946				
Nov.	77,605	72,671	2,159	79,126
Dec.	77,961	73,278	2,122	80,445
TOTAL	898,952	832,037	26,520	.....
1947†				
Jan.	85,783	80,524	2,164	78,874
Feb.	78,729	73,863	2,046	76,016
Mar.	83,195	77,113	2,623	74,422
Apr.	84,196	78,760	2,253	69,392
May	90,054	81,851	4,732	73,550
June	84,604	77,402	3,829	67,119
July	70,603	64,686	3,284	70,002
Aug.	75,060	68,271	4,021	68,659
Sept.	83,158	75,728	3,976	69,919
Oct.	92,119	83,592	4,763	67,280
Nov.	81,803	74,274	3,773	73,851
Dec.	87,215	79,495	4,393	74,814
TOTAL	1,051,742	960,732	51,139	.....
1948				
Jan.	85,432	77,433	4,593	74,579

* For sale only.

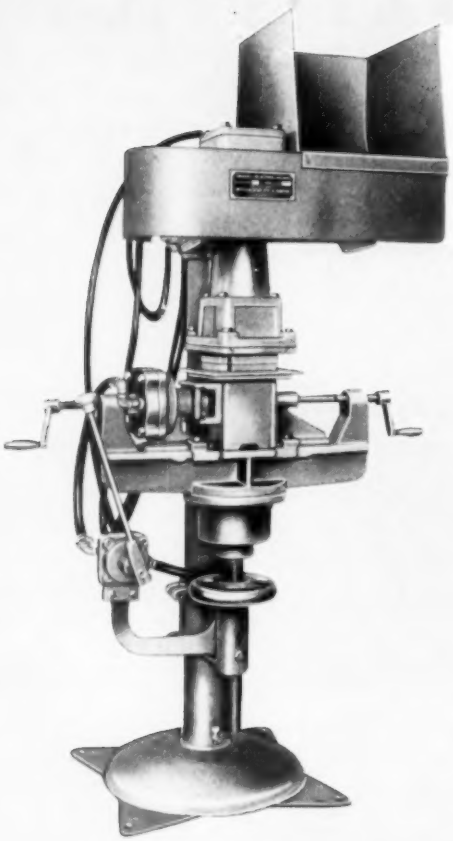
† 1947 figures include copper and copper-base alloy castings.

Magnesium Castings

(Thousands of pounds)

	Shipments Total	Shipments Sand	Shipments Perm. Mold	Unfilled *Orders
Nov.	716	574	41	4,294
Dec.	717	635	28	4,599
TOTAL	8,472	7,149	532	....
1947				
Jan.	809	723	40	4,480
Feb.	707	605	69	3,776
Mar.	677	593	45	3,276
Apr.	627	526	78	3,245
May	628	481	104	3,297
June	613	476	93	3,183
July	492	372	67	2,772
Aug.	523	382	83	3,267
Sept.	518	421	56	2,747
Oct.	616	557	21	2,659
Nov.	602	540	31	2,808
Dec.	669	586	39	2,730
TOTAL	7,693	6,404	729	....
1948				
Jan.	659	592	...	2,701

* For sale only.



POPULAR

The entire line of DEMMLER core blowing machines is popular because every DEMMLER core blower has proved itself a dependable, profitable investment.

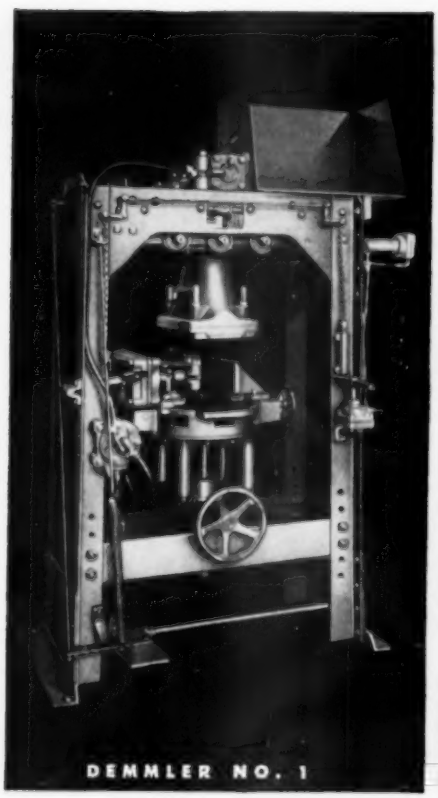
It is no news to the Foundry world that three prime requisites of profitable core making are rapid production, economical operation and the production of high quality cores. DEMMLER machines can be depended upon to meet all three of these requirements.

DEMMLER machines are ruggedly built throughout for hard foundry use. All have both horizontal and vertical adjustments. Jobs are easily and quickly changed.

Available in a wide variety of sizes to meet every requirement, DEMMLER core blowers possess scores of refinements born of long experience. First in the field, DEMMLER core blowers have led the field since 1911.

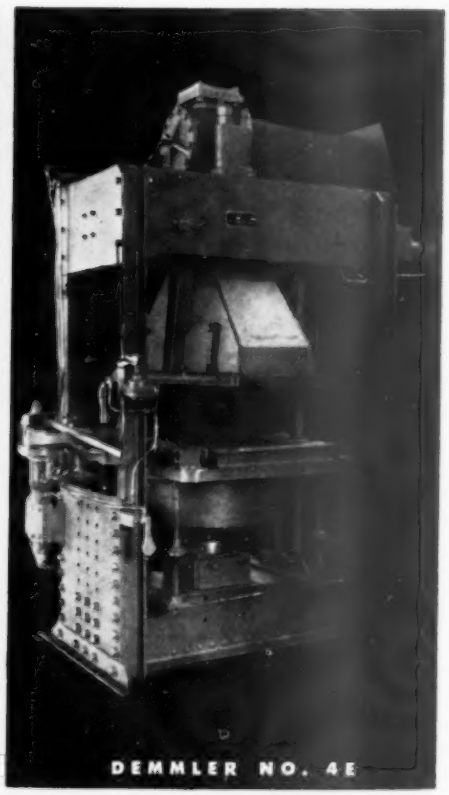
Before you buy a new core blower, be sure to investigate the many advantages DEMMLER machines offer. You'll be glad you did!

DEMMLER NO. 55



DEMMLER NO. 1

DEMMLER NO. 3E



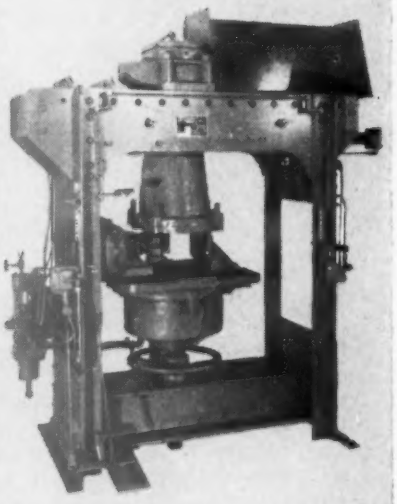
DEMMLER NO. 4E

MANUFACTURERS OF CORE BLOWERS EXCLUSIVELY SINCE 1911

because they are profitable to own

DEMMLER

CORE BLOWING MACHINES



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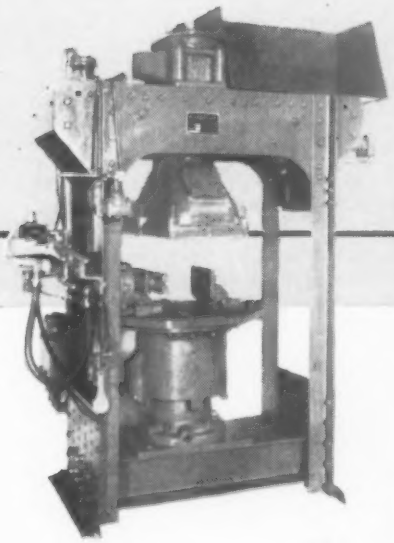
DEMMLER NO. 2



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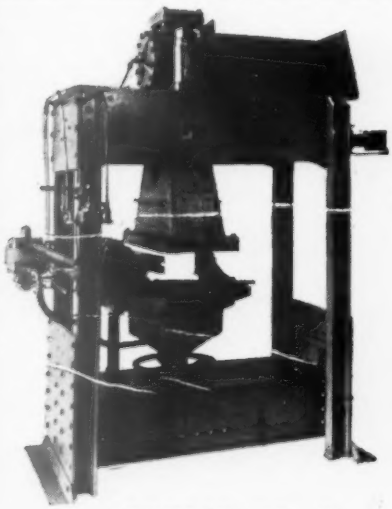
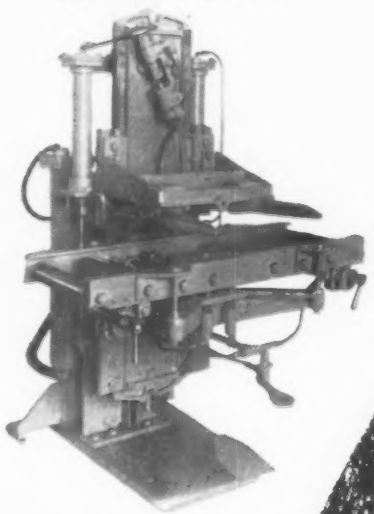


DEMMLER NO. 4

CORE BOX VENTS

Wm. Demmler & Bros. also manufacture a complete line of precision made core box vents —rigidly constructed in varying sizes of slotted brass, slotted steel and screen mesh.



DEMMLER
CORE ROLL-OVER
DRAW MACHINE

Wm. **DEMMLER** *& Bros*
Kewanee, Illinois

AROUND Detroit

By A. H. ALLEN
Detroit Editor
THE FOUNDRY

Use of coke breeze in the form of briquets meets with encouraging results at Pontiac's gray iron foundry . . . . New type engine seen as effecting major changes in casting requirements

COKE breeze is a material which accumulates wherever coke is handled and used, and despite the inherent heat units it contains, no particular value has been realized out of it. Usually when coke fines pile up too much they are simply carted away to a dump or used as fill. One ton of coke may develop anywhere from 100 to 200 pounds of breeze in its handling. Thus, a foundry using, say, 20 cars of coke a week would find itself faced with the problem of disposing of 10 to 12 tons of breeze a day. In some cases, fines go right along with the rest of the coke into the charging skip. In others, where coke is screened before use, the breeze is separated and must be disposed of in some way.

Gray iron foundry of the Pontiac Motor Division, which consumes about 800 tons of coke per week, decided to figure out some way to make use of the large quantity of fines which was accumulating. Briqueting appeared the logical method, so experiments were started in mixing the breeze with 5-10 per cent of portland cement and water, pouring the mixed material into molds and then vibrating and applying pressure to form a solid block. At first blocks were made about half the size of a concrete building block. These did not work so well in the cupola so the size was reduced to that of a standard brick.

Coke at Pontiac is given a fairly rough treatment from cars to cupola. It is dropped about 20 feet from cars onto a bar screen which sifts out everything under 1-inch size. Result is that about 12 tons of fines daily are available for briqueting. With coke priced at about $20 per ton, here is $240 worth of fuel available, which is ordinarily discarded. Obviously, if it can be made into usable briquets for perhaps $10 a ton or less, the savings are very much worth while.

Results so far have been most encouraging, but considerable research remains to be done before briqueting of coke breeze becomes an established procedure. For example, in one test briquets were charged into a cupola producing hard iron, and the results were unsatisfactory. Then the same briquets were charged into a cupola producing soft iron with complete success, temperature holding as well or better than when straight coke was used. Briquets are charged in a proportion of about 10 per cent of the entire coke weight.

An important factor is the quality of the coke. Briquets made from an inferior grade of coke breeze have proved worthless in the cupola. The question has been raised as to the probability of excessive ash developing from the use of briquets, which is of course tied in with the quality of the coke. So far, the ash problem does not appear too serious.

As far as is known, no earlier efforts are on record of attempting to briquet coke breeze. Hence the entire project is starting from scratch and will need much further study. At any rate, the results achieved so for at Pontiac are sufficiently encouraging as to suggest that the technique will ultimately find an important place wherever coke is used as a fuel.

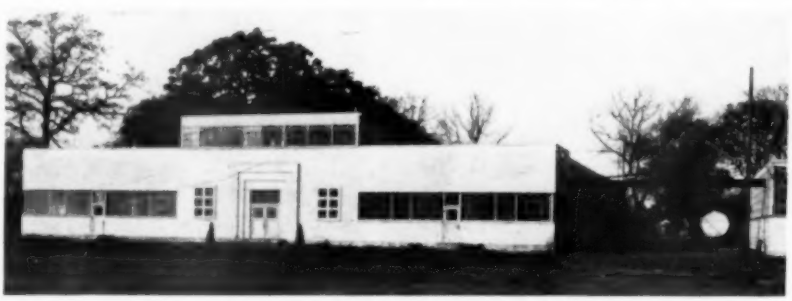
* * *

ANNOUNCEMENT that Oldsmobile has established a "Kettering engine" division, and will build a new plant to house engineering activity on the high-compression power plant, suggests that some major changes in castings for engines is not far off. A few block castings have been produced by Pontiac for the V-8 high-compression engine under study by Olds engineers, and recently the project was transferred from Pontiac to Chevrolet Gray Iron at Saginaw. This did not cause any tears to be shed at Pontiac, since no production foundry likes to fuss around with research projects which take far too much time out of regular work.

The high-compression engine which Kettering and his associates at General Motors Research Laboratories have been testing for the last two years or more, gives promise of realizing a 40 per cent saving in fuel by virtue of stepping up compression ratio to an eventual 12.5 to 1. The

(*Concluded on page* 196)

New Plant Is Modernly Designed



NEW manufacturing and laboratory facilities have been placed in operation by Acheson Colloids Corp., Port Huron, Mich. The new units incorporate latest structural and design developments for production efficiency and employee comfort.

The manufacturing section is comprised of two main production bays in which are employed the most modern methods of lighting, heating and ventilation. Laboratory sections are equipped for extensive research and product control.

Workers' facilities are highlighted by a modern lunchroom, private lockers, showers and recreational areas. The structure itself is glazed tile with hammered glass windows, steel frame and interior supports, and its layout permits its ultimate linking with future buildings to form an integrated plant.

"O.K. So You Pre-compress the Springs---Then What Happens?"

This fellow may sound a bit skeptical about Spring-Mounted Roller Conveyer, but that's not exactly so. Like other men who work with Foundry Conveyers, he knows that Roller Conveyer applied in this industry must have extra weight and strength built into it. He has seen a lot of too-light conveying equipment beaten to pieces in a short time under severe foundry service. That is why he is interested in Spring-Mounted construction. He is learning that when springs are pre-compressed to normal roller capacity, the load does not *bounce*, and the conveying surface is *smooth* and *even*. When the rollers are overloaded, the *springs* rather than the *bearings* of the rollers absorb the shock. Spring-Mounted Roller Conveyer is a Mathews development to meet the requirements of heavy industry for Roller Conveyer which will operate under severe conditions with a minimum of maintenance attention and expense, and it is establishing quite a reputation for itself by doing just that.

MATHEWS CONVEYER COMPANY
ELLWOOD CITY, PENNSYLVANIA

MATHEWS CONVEYER COMPANY WEST COAST
SAN CARLOS, CALIFORNIA

MATHEWS CONVEYER COMPANY, LTD.
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

(*Concluded from page* 194)

shift will be made by degrees, until the necessary octane rating can be made available. First version of the engine probably will have a compression ratio of around 8.5 to 1, although the basic design will be such that the ratio can be increased further without major retooling.

Olds and Cadillac may be the first with production models of the new engine, although Buick engineers also have been working on a design of their own. The latter is referred to as a Z-block design, because of the fact that cylinders in the opposing vees are staggered instead of being directly opposite one another. The angle of the vee also has been closed up considerably from that of the conventional V-8 engine.

It appears that these new engines probably will be of the valve-in-head type since this design permits better "breathing," a necessary factor if full advantage is to be realized from the high compression. They will require a gasoline of around 93 octane rating, not available commercially at present. Oil companies have indicated they will have such fuels ready by the time the engines are in production.

* * *

FOUNDRIES were among the first to feel the impact of the coal strike, most units in the Detroit area not having much more than two-weeks' supply of coke on hand. Shutting down of coke ovens early last month made the outlook bleak, since even an early return of miners to pits would not permit resumption of coke-making inside of ten days or two weeks. A tapering of automobile production because of insufficient castings appeared inescapable.

Readjustment of production schedules downward by Kaiser-Frazer Corp. resulted in a slowing of foundry operations both at the K-F Foundry Division in Dowagiac, Mich., and at Wilson Foundry & Machine Co. in Pontiac. The Willow Run producer had been aiming at an assembly schedule of 1500 daily and suppliers were starting to gear their operations accordingly when plans were changed and assemblies revised downward to 600-800 daily. This was immediately translated into changed schedules for engines and, in fact, all other supplies. Likelihood is seen of further changes in the K-F picture this summer.

Scrap Consumption Higher in 1947

Consumption of purchased scrap last year rose to 26,066,000 gross tons, an all-time record, according to the Bureau of Mines, Washington. Consumption of pig iron and scrap combined in 1947 is estimated at 106,312,000 tons, against 84,424,769 tons in 1946.

For all of 1947 total scrap consumption (purchased and home scrap) is placed at 54,106,000 tons, against 44,182,242 tons in 1946. Last year's figure includes consumption of 34,999,000 tons by open hearths, 9,433,000 tons by cupolas, 4,757,000 tons by electric furnaces, 2,232,000 tons by blast furnaces, 1,063,000 tons by air and Brackelsberg furnaces, and the balance by other melting units. Cupola scrap consumption compares with 7,642,162 tons in 1946.

Pig iron consumption in cupolas last year was 4,967,000 tons, against 4,118,486 tons in 1946. Total pig iron used for 1947 is estimated at 52,206,000 tons, compared with 40,242,527 tons in 1946. It is interesting that while pig iron used by open-hearth furnaces last year increased more than 31 per cent over 1946, consumption by cupolas rose less than 21 per cent.

Last year's 21 per cent increase over 1946 in scrap consumption by open hearths compares with a gain of 23.5 per cent in consumption by cupolas in the same period.

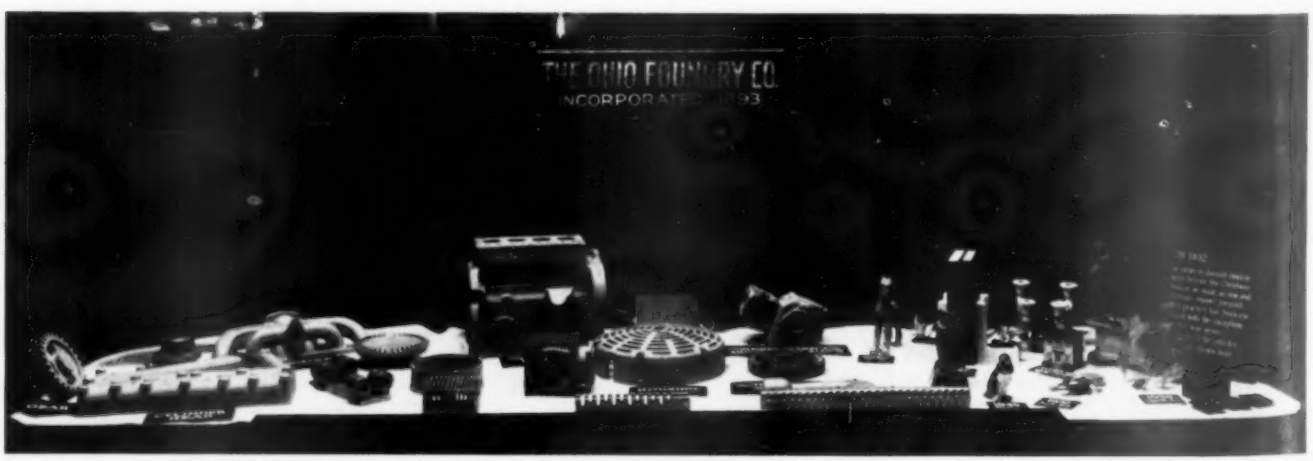
Corrosion Engineers Elect Officers

F. L. LaQue, in charge of the corrosion engineering section of the Development and Reseach Division of the International Nickel Co., New York, was elected president of the National Association of Corrosion Engineers at the latter's annual conference and exhibition in St. Louis last month.

Other officers chosen are: Vice president, H. H. Anderson, vice president and general manager, Shell Pipe Line Corp., Houston, Tex.; treasurer, O. C. Mudd, chief corrosion engineer, Shell Pipe Line Corp., executive secretary, A. B. Campbell.

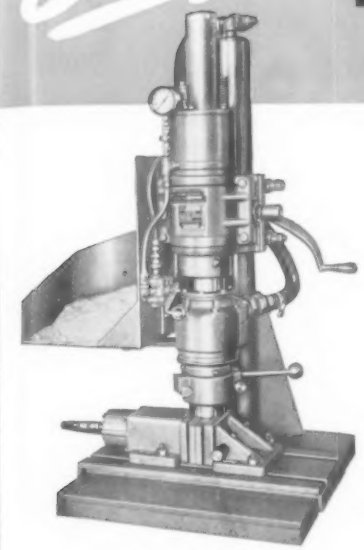
Steel Melting Filmed

Use of oxygen and other modern techniques of electric furnace production of stainless steel is brought to the screen in full color in the latest motion picture to be released by Allegheny Ludlum Steel Corp. Titled "Melting and Refining of Modern Steels," the 16-mm movie was shot at the company's Brackenridge, Pa., plant and is a start-to-finish story of stainless steel as it is melted in 50-ton electric furnace. Designed for technical groups, this 20-minute film may be obtained for free showings on request to the company's headquarters in Pittsburgh.

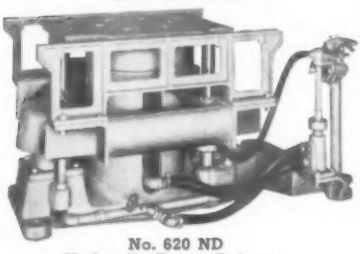


GRAY IRON CASTINGS: This display of castings produced by the Ohio Foundry Co., Cleveland, recently attracted public attention in the window of the National City Bank

Step-Up PRODUCTION with MILWAUKEE FOUNDRY MACHINE



No. 3 Bench Style
Milwaukee-Taccone Core Blower
All types of blowheads.



No. 620 ND
Hydraulic Power Stripper.

MODERNIZE YOUR FOUNDRY . . .

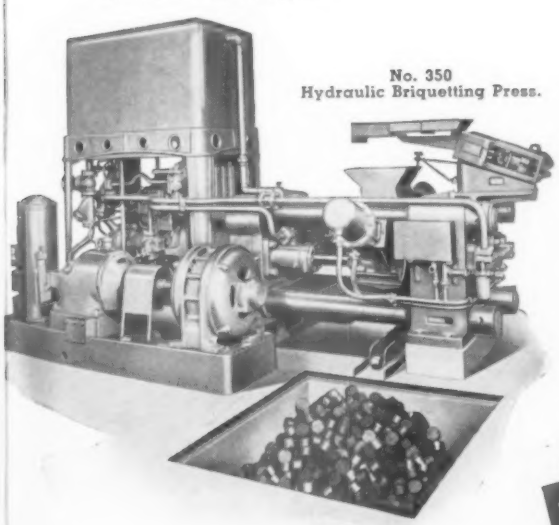
Step up foundry production and reduce costs with dependable Milwaukee foundry machines. They incorporate the latest engineering features and are designed to perform specific foundry jobs quickly, efficiently and safely. Backed by 28 years experience in the manufacture of quality foundry machines.

MILWAUKEE NEWCOMERS

Milwaukee Foundry Equipment Company's pioneering in new foundry methods has led to the addition of four newcomers to the Milwaukee line of foundry machines. These four machines will help you modernize foundry methods and streamline your operations:

1. MILWAUKEE-TACONNE CORE BLOWER — Designed for bench style operation, blowing intricate cores up to 4 lbs. in weight. Has easy blow valve adjustment and new EXPLOSION type action.
2. MILWAUKEE HYDRAULIC POWER STRIPPER — Equipped with adjustable rails for various flask widths. Draws with smooth, steady action. Capacity up to 3,500 lbs. at 80 lbs. line pressure.
3. MILWAUKEE CORE GRINDER — Grinds wide range of large cores. Dual grinding tables. Adjustable wheel arm swings progressively around 360° circle. Vibrationless performance.
4. JOLT SQUEEZE RAIL STRIPPER — New control features for utmost safety. Increased penetration produces uniform molds with less jolting. Constant parallelism between table and platen.

Write for BULLETINS listed below.



No. 350
Hydraulic Briquetting Press.

No. 71 — Dual Table Core Grinder, illustrated above. No. 70 Rotary Table Core Grinder, also available.

No. 213 — Arm Type
Jolt Squeeze Rail Stripper
available in 4 sizes.

BULLETINS NOW AVAILABLE

- No. 106 Jolt Squeezing Strippers — Arm Type
- No. 107 Jolt Squeezing Strippers — Car Type
- No. 110 Jolt Squeeze Pin Strippers
- No. 113 Plain Jolt Molding Machines
- No. 114 Jolt Pin Lifters
- No. 115 Jolt Squeeze Rollover Draw
- No. 116 Core Grinder — Rotary Table
- No. 117 Hydraulic Briquetting Press
- No. 118 Jolt Squeezers
- No. 119 Milwaukee-Taccone Core Blower

114	115	116	117	118

113
110
107
106

MILWAUKEE FOUNDRY EQUIPMENT CO.
3238 W. Pierce St., Milwaukee 4, Wis., U.S.A.
Please send bulletins checked here to:

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City ..... Zone ..... State .....

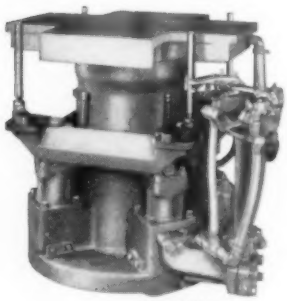
Step-Up PRODUCTION with MILWAUKEE MOLDING MACHINES

A MACHINE FOR EVERY MOLDING REQUIREMENT

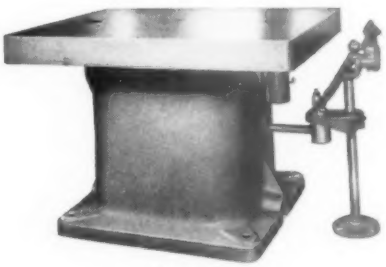
The complete Milwaukee line of high-speed molding machines includes a model for every foundry molding job. Every machine is designed and built to give long, hard service. Milwaukee Molding Machines are rugged in construction with a minimum of moving parts and inexpensive replacement of expendable parts. Milwaukee Molders are machined to close tolerances to assure accurate, reliable performance.

If your foundry problem is of a special nature, call in a Milwaukee Foundry Equipment Engineer to discuss it with you. For more complete information write for bulletins. (See reverse side for list of bulletins available.)

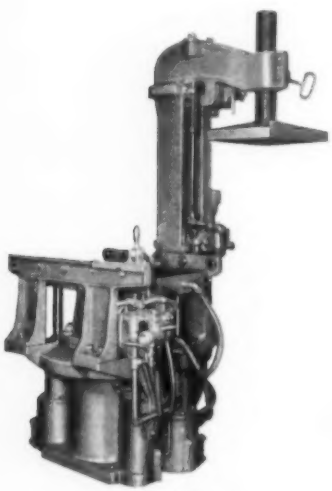
No. 123 Stationary Type
Jolt Squeezer
10" and 12" piston sizes.



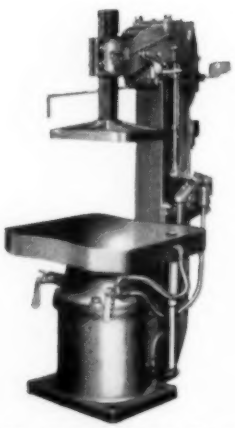
No. 1030
Jolt Pin Lifter
available in 6 sizes.



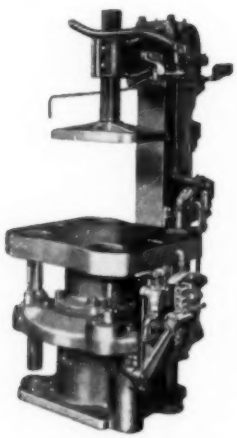
Plain Jolt
All sizes up to 8,000 lbs.



No. 166
Jolt Squeeze Strip Roll-off
available in 6 sizes.



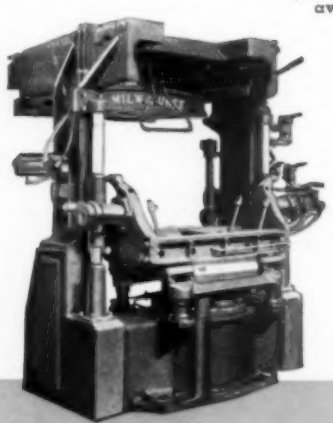
No. 161 — Stationary Type
Jolt Squeezer
14" and 16" piston sizes.



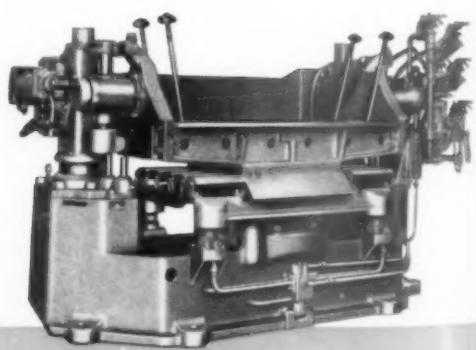
No. 165
Jolt Squeeze Pin Stripper
available in 7 sizes.

No. 124 — Portable Type
Jolt Squeezer
10" and 12" piston sizes.

No. 214 — Car Type
Jolt Squeeze Stripper
available in 3 sizes.



No. 217
Jolt Squeeze Rollover Draw.



No. 428
Jolt Rollover Draw
available in 6 sizes.

MILWAUKEE FOUNDRY EQUIPMENT COMPANY, MILWAUKEE 4, WIS., U.S.

Printed

THE FOUNDRY DATA SHEET
TENTATIVE INDUSTRIAL RADIOGRAPHIC STANDARDS FOR STEEL CASTINGS
MAY, 1948

TENTATIVE INDUSTRIAL RADIOGRAPHIC STANDARDS FOR STEEL CASTINGS

ASTM Designation: E 71-47 T; Issued 1947

Standards have been reproduced from the Bureau of Ships Radiographic Standards dated July 1, 1942, through the courtesy of the Navy Department

Scope

1. (a) These reference standards consists of two sets of industrial radiographic negatives of defects occasionally encountered in carbon-steel and alloy-steel castings, and are intended to assist in the classification of those defects revealed in castings subject to radiographic inspection. The two sets of reference standards consist of the following:

X-Ray Radiographic Standards, for x-ray inspection of castings using 220 kv., max.

Gamma-Ray Radiographic Standards, for gamma-ray and million-volt x-ray inspection of castings.

NOTE.—The set of X-Ray Radiographic Standards and the set of Gamma-Ray Radiographic Standards are available from A.S.T.M. Headquarters as follows:

(*a*) *X-Ray Radiographic Standards.*—Set of 31 plates (5 by 7 in.) in a 9¾ by 8 in. ring binder at $30.00 per set.

(*b*) *Gamma-Ray Radiographic Standards.*—Set of 31 plates (5 by 7 in.) in a 9¾ by 8 in. ring binder at $30.00 per set.

Both sets ((*a*) and (*b*)) can be procured at a special combination price of $55.00.

(b) These reference standards are intended for use when they are specified in the inquiry, contract, or order and when they are mutually agreed upon by the manufacturer and the purchaser. It is admittedly impossible rigidly to interpret radiographs to a set of standards; consequently there is a need for close cooperation between the manufacturer and the purchaser in applying these radiographic standards.

Basis for Use

2. (a) Areas to be radiographed on steel castings subject to radiographic inspection shall be clearly marked on drawings submitted with the inquiry, contract, or order.

(b) The service requirement classification (Note) and the number of pieces made from the same pattern which are to be radiographed shall constitute a part of the inquiry, contract, or order. The service classification of each area to be radiographed should be indicated on the marked drawings.

NOTE.—Suggestions for the classification of castings according to service are given in Table I. In this table castings have been grouped into five classifications in accordance with their possible service requirements, size, wall thickness, etc. This classification is intended only as a guide to the purchasers of steel castings.

X-Ray Radiographic Standards

3. (a) The set of x-ray radiographic reference standards consists of 31 plates (5 by 7 in.). Each plate is numbered and contains a radiograph of a defect using x-rays of 220 kv., max. (Note). The plates are divided into groups according to the type of defect as shown in Table II.

(b) The x-ray radiographic standards are intended to be used for comparison with radiographs from actual castings when x-rays (Note) have been used in the inspection.

NOTE.—In general, when million-volt x-rays are used, the radiographic standards for gamma-ray inspection apply.

4. (a) The set of gamma-ray radiographic reference standards consists of 31 plates (5 by 7 in.). Each plate is numbered and contains a radiograph of a defect using gamma rays from radium. The plates are divided into groups according to the type of defect as shown in Table II.

TABLE I.—SUGGESTIONS FOR CLASSIFICATION OF CASTINGS TO BE USED WITH RADIOGRAPHIC STANDARDS.

Class	Service
1	High-pressure or high-temperature service castings, or both (wall thickness less than 1 in.). Machinery castings* subject to high fatigue or impact stresses (wall thickness less than ½ in.).
2	High-pressure or high-temperature service castings, or both (wall thickness 1 in. or greater). Low-pressure service castings (wall thickness less than 1 in.). Machinery castings subject to high fatigue or impact stresses (wall thickness of ½ in. and greater).
3	Low-pressure service castings (wall thickness of 1 in. and over). Machinery castings subject to normal fatigue or impact stresses.
4	Structural castings† less than 3 in. in thickness and subject to high service stresses. Machinery castings subject to low impact stresses or vibration.
5	Structural castings 3 in. or more in thickness and subject to high service stresses.

* Machinery castings are dynamic parts or members in contact with working parts.
† Structural castings are construction parts for machinery castings.

(b) The gamma-ray radiographic standards are intended to be used for comparison with radiographs from actual castings when gamma rays from radium or million-volt x-rays have been used in the inspection.

TABLE II—GROUPING AS TO TYPE OF DEFECT

Group	Defect
A	Gas and blowholes
B	Sand spots and inclusions
C	Internal shrinkage
D	Hot tears
E	Cracks
F	Unfused chaplets
G	Internal chills

Radiographs of Actual Castings

5. Radiographs of the actual castings shall be made in accordance with any approved method agreed upon by the manufacturer and the purchaser.

Use of Standards

6. (a) The radiograph of the actual casting shall be compared with the reference standard radiograph (Note).

NOTE.—The reference standard radiographs may be removed from the binder for viewing before an illuminator and then replaced in their correct positions. By placing a shaded desk lamp in a position to shine directly on the blank page, as shown in Fig. 1, this lighted page will serve as an illuminator against which to view the standard negatives without removing them from the binder.

(b) Table III shall be used as a means for determining the reference standard radiograph showing the maximum acceptable amount of any type of

TENTATIVE INDUSTRIAL RADIOGRAPHIC STANDARDS FOR STEEL CASTINGS

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defect. The procedures described in Paragraphs (c) to (e) shall be used to determine acceptability.

(c) When the radiograph of the actual casting shows but one type of defect which is equal to or better than the borderline reference standard, the corresponding portion of the casting shall be considered as acceptable without repair. If the defects are more numerous than indicated by the borderline standard, the casting shall be unacceptable until properly repaired by welding as prescribed in Section 7.

(d) When a single radiograph shows more than one type of defect, the following procedure shall be used in judging its acceptability:

Method for viewing standard negatives without removing from binder

(1) When one type of defect predominates and the other types are equal to or better than an acceptable (not borderline) standard for their particular class, the borderline standard of the predominating defect shall govern without regard to the other types of defects.

(2) When two or more types of defects are present to an extent equal to the borderline standard for each type, all borderline defects shall be considered unacceptable and the casting shall be rejected until properly repaired by welding as prescribed in Section 7.

(e) In general, there will be no limit with regard to the extent of acceptable defects throughout the area on a particular casting corresponding to the casting classification, provided that no 5 by 7-in. area throughout the section contains defects in excess of those indicated on the borderline standard.

Repair by Welding

7. Castings rejected through application of the radiographic standards may be repaired by welding, as agreed upon by the manufacturer and the purchaser, in accordance with the requirements specified in the applicable steel casting specifications of the American Society for Testing Materials. If acceptability of repair welds by radiography is required, such acceptability shall be determined by these standards. The class number assigned to the repair welding shall be the same as that used for the area of the casting repair welded.

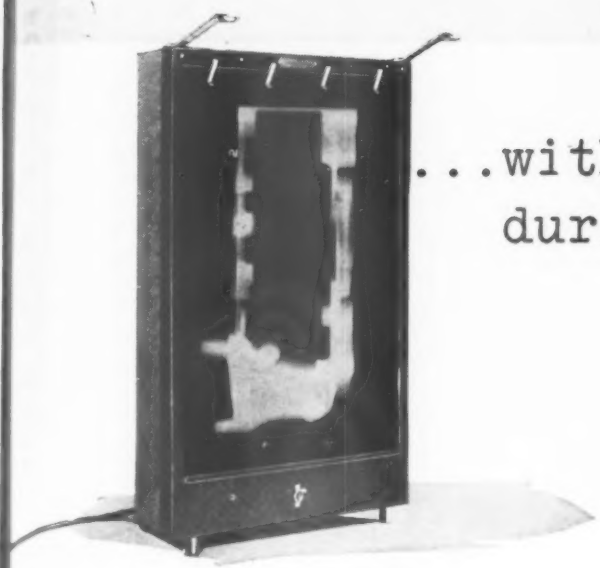
TABLE III.—RADIOGRAPHIC STANDARDS.

Plate Number	Class 1	Class 2	Class 3	Class 4	Class 5
			GAS AND BLOWHOLES		
A1	*BORDERLINE*	Acceptable	Acceptable	Acceptable	Acceptable
A2	Unacceptable	*BORDERLINE*	Acceptable	Acceptable	Acceptable
A3	Unacceptable	Unacceptable	*BORDERLINE*	Acceptable	Acceptable
A4	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE*	Acceptable
A5	Unacceptable	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE*
A6	Unacceptable	Unacceptable	Unacceptable	Unacceptable	Unacceptable
			SAND SPOTS AND INCLUSIONS		
B1	*BORDERLINE*	Acceptable	Acceptable	Acceptable	Acceptable
B2	Unacceptable	*BORDERLINE*	Acceptable	Acceptable	Acceptable
B3	Unacceptable	Unacceptable	*BORDERLINE*	Acceptable	Acceptable
B4	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE*	Acceptable
B5	Unacceptable	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE*
B6	Unacceptable	Unacceptable	Unacceptable	Unacceptable	Unacceptable
			INTERNAL SHRINKAGE		
C1	*BORDERLINE*	Acceptable	Acceptable	Acceptable	Acceptable
C2	Unacceptable	*BORDERLINE*	Acceptable	Acceptable	Acceptable
C3	Unacceptable	Unacceptable	*BORDERLINE*	Acceptable	Acceptable
C4	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE*	Acceptable
C5	Unacceptable	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE*
C6	Unacceptable	Unacceptable	Unacceptable	Unacceptable	Unacceptable
			HOT TEARS		
D1	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE**	Acceptable
D2	Unacceptable	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE**
D3	Unacceptable	Unacceptable	Unacceptable	Unacceptable	Unacceptable
			CRACKS		
E1	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE**	Acceptable
E2	Unacceptable	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE**
E3	Unacceptable	Unacceptable	Unacceptable	Unacceptable	Unacceptable
			UNFUSED CHAPLETS		
F1	Unacceptable	*BORDERLINE*	Acceptable	Acceptable	Acceptable
F2	Unacceptable	Unacceptable	*BORDERLINE*	Acceptable	Acceptable
F3	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE*	Acceptable
			INTERNAL CHILLS		
G1	Unacceptable	Unacceptable	*BORDERLINE*	Acceptable	Acceptable
G2	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE*	Acceptable
G3	Unacceptable	Unacceptable	Unacceptable	Unacceptable	*BORDERLINE*
G4	Unacceptable	Unacceptable	Unacceptable	Unacceptable	Unacceptable

* Acceptable only when the angle between the defect and the direction of the principal stress is not greater than 20 deg.

Increase sound casting yield...

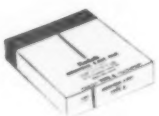
Progress in increasing sound foundry yield is due largely to foundrymen's adoption of new and proved practices and technics—both before and during production runs. Radiography is contributing greatly to improving foundry methods by providing records of the internal condition of the casting for detailed study.



...with radiography before and during production runs...

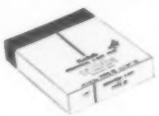
Radiographic examination of pilot castings helps develop sound technics quicker . . . gets full production runs going sooner. Used as a spot check, radiography assures uniformly sound casting output. Result: radiography reduces rejections . . . increases sound yield . . . more than pays its own way.

For maximum radiographic visibility- use Kodak Industrial X-ray Films...



Kodak Industrial X-ray Film, TYPE A . . . for x-ray and gamma-ray work in sections where fine grain and high contrast are desirable for maximum sensitivity at moderate exposure times.

Kodak Industrial X-ray Film, TYPE K . . . designed for gamma-ray and x-ray radiography of heavy steel parts, and of lighter parts at limited voltages where high film speed is needed.



Kodak Industrial X-ray Film, TYPE M . . . first choice in critical inspection of light alloys, thin steel at moderate voltages, and heavy alloy parts with million-volt equipment.

Kodak Industrial X-ray Film, TYPE F . . . with calcium tungstate screens—primarily for radiography of heavy steel parts. For the fastest possible radiographic procedure.

They provide the high radiographic sensitivity—the combination of speed, contrast, and fine grain—required for the detail visibility you need in critical examination of castings.

For complete information on the types best adapted to your job, see your local x-ray dealer—or write to

Eastman Kodak Company
X-ray Division, Rochester 4, N. Y.

"Kodak" is a trade-mark

Be sure to look over Kodak's radiographic exhibit in Booth 338 at the AFA Convention in Philadelphia, May 3rd to 7th.

RADIOGRAPHY... another important function of photography

Kodak

MANAGEMENT'S ROLE IN INDEPENDENT ENTERPRISE

(*Continued from page* 133)

do, but deficits are his own undoing if they occur and the losses are not absorbed by a host of shareholders. Poor judgment on the part of management in a corporation can be rectified by changing managers; unwise moves by the enterpriser can lead to financial ruin. The power to shift budgeted items is in the hands of the owner-manager but the final responsibility is his, also.

Impulses must be checked carefully and resistance to persuasive sales approaches must be cultivated lest budgets become hopelessly out of balance.

Certain responsibilities of management rest equally upon the corporation manager and upon the entrepreneur. Both must be alert to such matters as new outlets for their products, new methods and equipment, the sources of raw materials, and the continuation of research in their fields. Every manager is concerned with the problems of distribution, transportation, advertising and human relationships.

It is in the approach to these problems that the professional manager of a corporation and the owner-manager differ. In one case the approach is purely objective, in the other it is impossible to divorce the personal from the perfunctory business method. The manager of a stock company acts as the human agent of an association of investors which is chartered by the state to constitute an entity before the law, enabling that entity to sue and be sued. Such a manager properly molds his personality with the larger unit; he becomes merely a symbol, albeit a very capable one, and that symbolism rarely extends to any other activities in which he may be engaged as a private citizen. Few people are concerned about his personal habits, his domestic arrangements, his clubs, church, politics or favorite hobbies.

The owner-manager must always remember that he is an individual both before the law and in the public mind. In most cases he resides in the community in which his business is centered. Because he is an employer of labor which makes its home in the same community and because of the leadership expected of him, he becomes the cynosure of many eyes. His every act, whether in business, political or social life, must be circumspect. The good will of his neighbors is an intangible asset or the lack of it a pressing liability. For this reason he must weigh many decisions in a light which would give little or no concern to his contemporary in a chartered corporation. If coal and oil companies are competing for his patronage he may be forced to consider the community interest in these competing enterprises instead of merely deciding the relative merits of the two fuels. If two rival railroads tap his territory he may be constrained to divide his patronage between them to retain the good will of both, or he may find it necessary to contribute to many charitable and civic enterprises whose leaders would never think of approaching the manager of a corporation that happened to have a unit established in their city or town.

The personal element enters the picture in a positive way in dealing with such matters as establishing research units, promotions among the personnel, discipline, labor relations, advertising and efficient routine in the plant. If wisely handled, this personal relationship can be made an asset instead of a handicap to the owner-manager. To bring about such a desirable end, however, it is necessary that the manager exert himself in many ways beyond the ordinary duties of management.

How can he win and hold the goodwill of his neighbors? There is no exact formula that can be recommended and there are so many complex factors involved in every situation that no general rule can be laid down. There are, however, some practices which have proved successful in cases where they have been tried.

Interest in Community Welfare

First in the list of these practices is the exercise of a sincere and active interest in community welfare. It goes without saying that the business will profit from healthy environs, good schools, adequate hospitals, public parks and recreation facilities. The manager can take an active part in striving for such improvements. Frequently it is tactful to permit the actual leadership in such projects to remain centered in the hands of others while the manager serves as a lieutenant in the campaign. Unselfish service of this type opens an almost certain path to winning public gratitude.

A second approach to the favor of the community can often be made through what I choose to call "good will advertising." Others may prefer to speak of it in terms of "public relations." By this I mean slanting the advertising in such a way that customers may learn of the fine assets of the community in which the articles for sale are manufactured and at one and the same time, impress upon the citizens of your community that the business establishment is proud to be located there. In this way advertising can become a two-edged sword. It may be hoped that such gestures will serve to build a fine spirit of loyalty among the employees of the firm.

The historic approach is the one most likely to win the greatest favor, for all dwellers in the community share equally in the glory that the past confers upon the present. Yet, this presentation of historical data must not be presented in textbook style. History of any kind, to be of

(*Concluded on page* 205)

MINIATURE LOADER: This working model of the Frank G. Hough Co.'s Pay-loader is intended for display purposes only, although it is powered by a ⅛-hp electric motor to operate the boom and bucket control hydraulically. The model is scaled to one-fourth size and was built for the company by Dick Thierman of Meili-Blumberg Corp., New Holstein, Wis.

DoALL BANDSAWS

...for Any Sawing Job!

ALL CASTINGS are sawed better, faster and at less cost with DoALL bandsaws—latest engineering achievements in sawing progress; time-tested by modern industry; do jobs previously considered impossible.

Many different models and sizes for shops large or small, priced to suit any budget. Besides, a DoALL bandsaw is "tailored" to exact requirements—the right cutting speed, set or variable; the right throat clearance and work-height capacity; the right accessories.

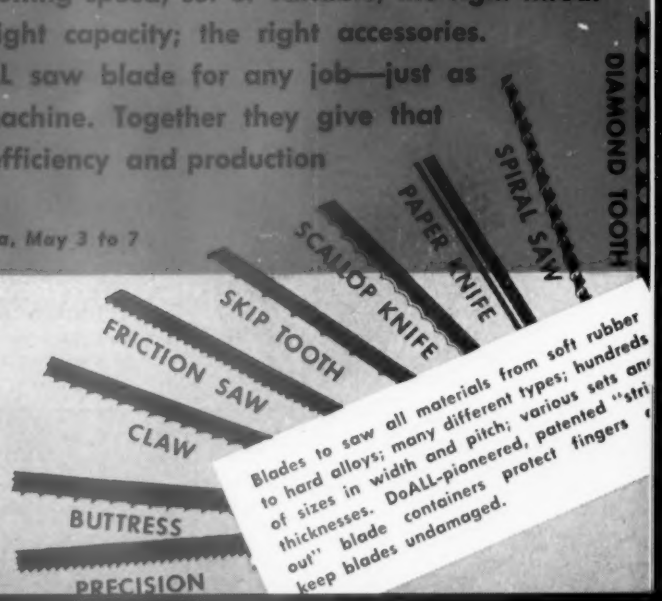
Also, there's a DoALL saw blade for any job—just as important as the right machine. Together they give that "teamwork" for high efficiency and production economy.

13 Models

of high-speed bandsaws. DoALL—the world's bandsaw headquarters—is in constant touch with all industries; provides engineering assistance on "sawability" of materials to cut production costs. Write about your problem.

ZI-F-48

Visit our Exhibit, Booth 732, A.F.A. Convention, Philadelphia, May 3 to 7


DIAMOND TOOTH
SPIRAL SAW
PAPER KNIFE
SCALLOP KNIFE
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FRICTION SAW
CLAW
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PRECISION
Blades to saw all materials from soft rubber to hard alloys; many different types; hundreds of sizes in width and pitch; various sets and thicknesses. DoALL-pioneered, patented "stri
out" blade containers protect fingers
keep blades undamaged.

The DoALL *Company*

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REPRESENTATIVES IN 56 COUNTRIES

DoALL STORES IN KEY CITIES

Des Plaines, Illinois

Cable Address: DoALL, Des Plaines

Are you getting enough melts per lining?

MANY METAL MELTERS have found that Norton Refractory Cements will give greater production without costly "down time" for patching or relining. A full selection of ALUNDUM* (aluminum oxide) and MAGNORITE* (fused magnesia) cements are available for induction, arc electric and fuel-fired furnaces.

Both ALUNDUM and MAGNORITE mixtures are chemically stable, highly refractory with low electrical conductivity. When mixed with carefully chosen bonds, also having refractory properties, they provide a complete range of cements which are used by mixing with water to a working consistency. Heat is required to mature the bond and develop full body strength.

Norton Refractory Cements are widely used for melting copper, high copper alloys and alloy steels. Due to the many factors which must be considered in selecting a suitable cement, you may wish to request a recommendation for the correct mix from a Norton refractories engineer.

* Trademark

NORTON REFRACTORIES LIKE HEAT

NORTON COMPANY, WORCESTER 6, MASS.

(*Concluded from page* 202)

value, must be functional; it must have a bearing upon the present. Therefore, if your plant is located in a rich agricultural area let the traditions of good husbandry permeate your copy; if it is in the lumber country, recount the adventures of the "timber cruise." Wherever possible an effort should be made to correlate the skills and deeds of the past with the progress and advancement of your enterprise. This must be done smoothly, of course. In all copy let the "human interest" motive dominate the style and content.

The prospective customers who read your advertising will relish such an approach as different from conflicting claims and errant ballyhoo which frequently passes for advertising. If the copy is good it will find its way to the library instead of the waste basket in your customer's office, while at home it will be cherished, preserved and, very probably, be used as text material in the schools.

Interest in Politics

A third positive move which the owner-manager should make is active interest in the political affairs of his community, state and nation. This should never be done in a bitter partisan way. To ignore this responsibility of management is to invite the election of persons inimical to the business interest, inefficient or perverse in the performance of duties as they affect your establishment or downright dishonest in the handling of such matters as public utilities, franchises, the courts, police protection, foreign trade or any other matters which impinge upon the proper conduct of your business.

All managers must recognize the need to keep abreast of the news, both domestic and foreign. They must train themselves to distinguish between economics and heresy, fact and propaganda, event and rumor, true vision and mere fortune-telling. There are many agencies which supply expert information about business trends, market quotations, credit ratings and the like. The wise manager must endeavor to get a wider scope of interest. That earthquake in the East Indies may cut off the supply of raw material, or that insurrection in the Grand Chaco may divert the demand for your product into other channels. That loan extended to a struggling European state may open a new market or reopen a closed one.

The owner-manager must indeed, be a many-sided man. Perhaps it may be said that his chief function is the same as it was in that simpler age before large scale production and big business appeared on the horizon. His first obligation to himself and his staff has always been to show profits, but the passing years have wrought great changes in his methods and his obligations. To compete successfully with the big business corporation he has had to assume new and additional duties. The owner-manager constitutes two of the four factors of production today; he is both capital and management, and that is why he is frequently called a "captain" of modern industry.

VETERAN LOOKS AT JOBS AND EMPLOYERS

(*Continued from page* 127)

have made a deep and a very distinct impression upon me.

First of all, the veterans are a superior type of men. They are mature, dignified, well behaved. I suspect that most of them do better work in their classes than the civilians.

And they have been easy to handle. There have been no problems of discipline or morale. Soldiers returning from the wars have not always been an unmixed blessing in the community. They have been inclined to boast and to strut, and to lord it over their fellow citizens. We expected that the veterans, after two or more years of the toughest kind of adventure on the battlefields of the world, would find the routines and the disciplines of college petty and fussy in comparison. Our apprehensions were unfounded. The veterans have not merely adjusted themselves to school work and life; they have gone out of their way to co-operate not only with their fellow students, but even with the faculty.

The veterans are resourceful; they are not easily stumped, and their ways of solving their minor difficulties are often interesting and sometimes amusing. A number of veterans were members of a design class which met on the opening afternoon of the world series. They asked if they might install a radio in the drawing room. The instructors feared that the work of the class might be too much disturbed by the broadcast of a ball game, and declined the request. The day was warm and windows were wide open. Five or six of the veterans parked their cars outside and just under the windows of the drawing room. Then they turned on the radios in the cars full blast, and the class had their ball game broadcast after all. The teachers were secretly delighted by the ruse, and possibly not unwilling to listen to the broadcast themselves; but had they insisted that the radios be turned off, the veterans would have complied willingly and courteously.

The veterans' reasons for going to college are somewhat different than we anticipated; their motives are less direct. During the war we thought that they would study engineering with the single objective in view of getting a good job and getting it soon. We expected them

(*Continued on page* 208)

NEW ABRASIVES PLANT: Groundbreaking for building number two of the Coated Products Division, the Carborundum Co., Wheatfield, N. Y., took the unique form of cement cutting when H. K. Clark, company president, on Mar. 15 made the first cut in concrete which is being removed to make way for the foundation of the new building scheduled for completion in September

Above—Aluminum Flasks ready for delivery, a small part of another large order.

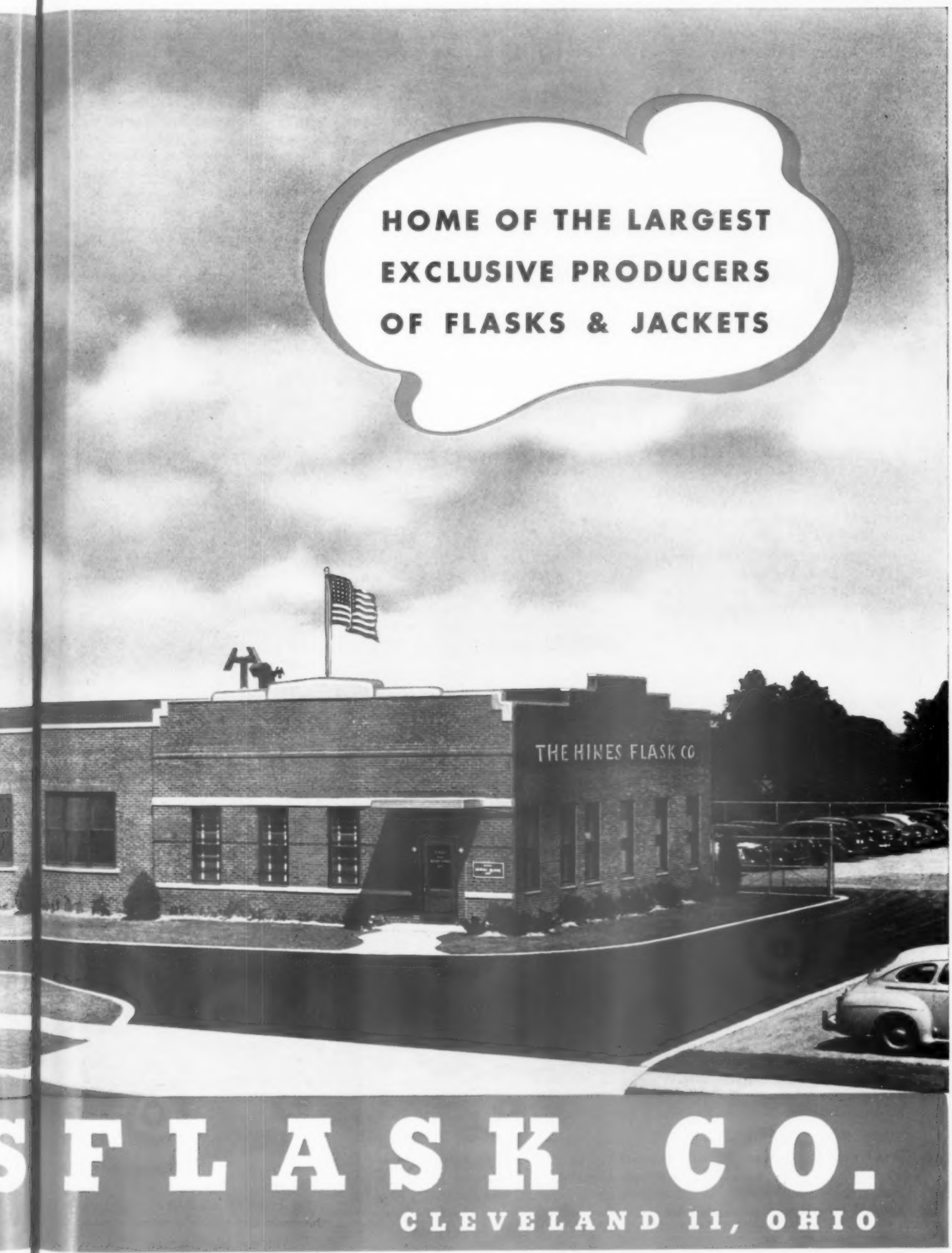
Plan to Visit Our Exhibit

BOOTH 1013

PHILADELPHIA MAY 3-4-5-6-7

THE HINES

3431 WEST 140th ST.



S FLASK CO.

CLEVELAND 11, OHIO

(*Continued from page* 205)

to be impatient of any study or school exercise which did not constitute immediate and obvious preparation for a position. Few of them seem to be thinking much as yet about actual employment. They are studying to get a broad education. They realize that our mode of life and our civilization are highly complex, and they are afraid that, without an education, they will not be able to hold their own in all the complexity.

Standard of Living—Each generation, in succession, achieves a higher standard of living. In his youth, my father considered that electricity and running water in the home were luxuries to be enjoyed only by men of ability who had worked hard, and whose work had been more than ordinarily successful. In my turn, I took electricity and running water quite for granted as an integral part of the existing order, little different from sunlight and free fresh air.

In the schools, in the services and elsewhere, the veterans have been told about the American standard of living, and they have taken it seriously. They see the advertisements in the newspapers and magazines. Without question—just as I assumed that I was entitled to electricity and running water, and for no reason except that they are American citizens—they assume that they are entitled to the following: Automobiles, radios, power washing machines, refrigerators, automatic heating, jewelry and hairdressing for their wives, good liquor if they like it, touring and vacations, recreation and amusements. There are exceptions, but the average veteran can see no connection whatever between these things and either the competence or the output of his work; he believes that these things would belong to him, somehow, even if he did not work at all. And he will be deeply hurt if he finds that he cannot afford all of them, even if he is only a common laborer.

Attitude Toward Employers — In my home town, when I was a boy, the people looked up to the president of a bank, or the vice president or works manager of one of the paper manufacturing companies, and these officials enjoyed a standing in the community because of their positions, regardless of personality or character. Later I was flunky to the night superintendent of a large steel foundry, and many of the immigrant laborers would stand with their hats in their hands whenever the superintendent passed, no matter how often he told them not to. But there were no veterans of World War II in my home town, nor were there any in that foundry night shift.

Veterans will size up a man on the basis of who and what he is in his own right; they care not a whit for his position, rank or title. In my college of engineering I had better get what respect I can for whatever of character and personality I may possess, because I'll get precious little for being a dean.

And I rather like it that way. A man who has to appeal to the authority of his rank or position because he can't otherwise hold his ground is an absurd and a pitiful figure indeed.

Challenge—Ours is a co-operative college of engineering; that is, our juniors, pre-seniors and seniors are employed in engineering industries three months out of every six, in order to supplement their theoretical training by practical experience. The veteran students are inclined to be critical of some of the people and some of the procedures which they observe on the job.

For example, they display an innate dislike for anybody who has made a pile of money in business or manufacturing during the war, more especially if he never could make any before the war. They tend to be sarcastic about the man who had nothing in 1940, and now owns a Lincoln Continental coupe, a 56-foot Chriscraft cruiser moored at the Detroit Yacht Club and a showy house with a red-tiled roof in a swanky part of town.

And they frequently ask challenging questions when they return to the college after a tour of work in the plants. Here is one:

"The chief engineer in our plant retired a couple of months ago, after more than thirty years on the job. He was a good man, knew all about his work, and knew the way out of any difficulty. He was paid $9500 per year. Now we have a much younger man in his place. He doesn't hurt himself any, he doesn't know the work, and he makes a lot of mistakes, and afterwards the rest of us have to straighten them out. But he's the son of one of the directors of the corporation and they say he gets $30,000. Do you think that's fair?"

I should answer questions like that!

A good many years ago I knew a man very well who lived in a Wisconsin town. Let's call him Mr. Brown. He was bookkeeper and office man for a chair manufacturing company.

He thought that the president of the company was the finest man who

(*Concluded on page* 210)

PRIZE WINNER: This view of a workman cleaning the inside of a chill mold at the plant of Mackintosh-Hemphill Co., Pittsburgh manufacturer of steel mill rolls, took first place for Dorothy Kniss Moore, Pittsburgh industrial photographer, in a recent photographic competition. The annual contest was conducted by the Industrial Advertising Council, Pittsburgh chapter of the National Industrial Advertising Association

Sterling

"THE WHEELS OF INDUSTRY"

These portables Give extra service and Take the punishment of this type of grinding

There is an important "give and take" to Sterling Vitrified and Resinoid Portable Grinding Wheels. They give many extra hours of grinding, and take less out of the workman while doing it!

Available in a wide variety of shapes and sizes, these "Wheels of Industry" grind welds, quickly remove gates and risers from castings, and do a better than usual job on all types of steel and castiron. Sterling's two popular specifications— KA146 P6 BPC for steel and C146 P7 BFC for castiron — are available from stock to solve your production problems, speedily and thoroughly!

For an easy-handling, cooler-running wheel, you cannot do better than specify STERLING every time! Our engineers will gladly cooperate!

Literature, describing these wheels and listing various specifications and applications, will be sent upon request.

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

(*Concluded from page* 208)

ever lived. He never lost a day on account of illness or for any other reason. He never forgot anything and he never made a mistake. He was supposed to have a two-weeks' vacation but they were sure to call him back after three or four days to called him into his office and told themselves into the moment he went away. And then he never did manage to get in the remainder of his vacation.

They paid him $100 per month. On the day he completed forty years with the company, the president called him into his office and told him that they were going to raise his pay to $120 in recognition of his long and faithful services. Mr. Brown's gratitude was really touching.

I suspect that it will not be necessary for me to assure you that there are no Mr. Browns among the veterans of the recent war. Nobody will impose upon the veterans, take advantage of them, exploit them; they are too independent and too tough, and they will talk back.

Leadership — The veterans apparently have not joined the American Legion in any considerable number; neither have they formed a new organization of their own. This may be significant because the veterans of each American war have, I believe, established some kind of association very shortly after they were demobilized. This time the veterans are looking for leadership. They are open to conviction. They will doubtless go along with any leader who looks good to them.

If American businessmen and employers, and others of sane and stable viewpoint, can capture the loyalty of the veterans, the veterans will become just as staunch defenders of our established institutions and mode of life as the American Legion has been. If, on the other hand, employers and other conservatives make no effort to win the veterans over, or make the effort and fail, it is possible that the veterans will line up with radicals and disturbers, especially if the veterans should develop grievances in time, and if nobody were to make any attempt to adjust those grievances.

But how can the veterans be won over? I should imagine that the way to win the veterans over is the same as the way to win over anybody else — customers, investors, bankers, labor officials, politicians—and that is to go after them.

Foundry owners and operators in the United States have not, by and large, done much going after young men, veterans or others. The result is that very little new blood has gone into the foundry craft for years, and—with many notable exceptions—the ordinary foundry is run just about as it was run in 1920; I mean the average foundry along the average railroad track in the average industrial town.

It is true that a few of the prominent foundries have instituted apprenticeships and other types of training. But such programs have been exceptional, and, being exceptional, they attracted very much attention. The resulting publicity has created the altogether erroneous impression that the foundry industry, as a whole, has been active in the schooling of young men.

Recruit Young Veterans

A month or two ago Mr. Scobie of the American Foundrymen's Association sent us recruiting circulars for the industry to be distributed among our senior engineering students. He had been planning something of the sort for a long time. Evidences are accumulating that the foundry industry is completely reversing its outlook on education and training. Probably the most important, and the most convincing, of these evidences is the new Foundry Educational Foundation. The foundation is a distinct credit to the foresighted and energetic leaders who created it, and should mark the rise of the foundry industry to a new level of effectiveness and success.

Now, how can the individual foundry operator go about this business of getting next to the young veterans? There are at least three things to be done:

1. Recruit and hire the veterans intelligently.

2. Set up apprenticeships and formal, postgraduate training for as many veterans as you can absorb in your plant.

3. Promote them as fast as they qualify, subject to the month by month situation in your shop.

And take the veterans seriously. You can't ignore them; you can't stick your head into the sand about them, or about what they want and think and are trying to do. The veterans are the next generation, coming up. They will soon be running your business for you, and they won't run it the way you want it run unless you have carefully trained them.

The veterans will form the public opinion of the next fifty years; they will cast the vote of the next fifty years; they will do the work of the next fifty years.

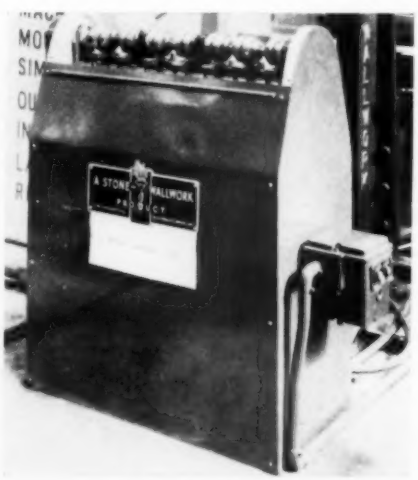
Editor's Note: This paper was presented before the annual Foundry Conference of Michigan State College, East Lansing, Mich., Oct. 31, 1947.

Pushbutton Molding Unit Introduced

AUTOMATIC pushbutton-operated molding machines were displayed by a British manufacturer at the recent Engineering and Marine Exhibition in London. The machine—a jolt squeeze unit—performs the full cycle of molding operations automatically and in the correct sequence. Manual effort is required only to place a flask on the machine, push the starting button and remove the completed mold.

Heart of the machine is a motor-driven control unit which is shown here. It can be arranged to control a battery of machines. Actuating element in the control unit is a camshaft carrying a series of small cams, beneath which is a rocker shaft carrying a corresponding row of rockers, which operate a row of pneumatic valves. Each valve controls compressed air to and from the machine for starting and stopping the operations of filling the flask with sand (this also can be done by hand); bringing swinghead over the table and starting jolt action; squeezing; stopping squeeze action and moving swinghead away from table; vibrating; drawing the pattern, and stopping control mechanism.

Complete cycle takes 10 seconds and is the same for all flask sizes within the range of the machine, which has a useful load of 400 lb. Maintenance of the time is intended to produce uniformly rammed molds. The new unit is sponsored by Stone-Wallwork Ltd., 157 Victoria St., London S. W. 1.



Redford

CORE BLOWER CARTRIDGE TYPE

A few of the thousands of cores that are made daily on Redford Core Blowers.

• PROVEN •

Hundreds of foundries are using Redfords as an efficient low cost means of producing small cores. The high percentage of reorders we receive proves that Redfords are profitable to own.

• SIMPLICITY •

The Redford reduces core blowing to its simplest form. Anyone can understand—operate and maintain it.

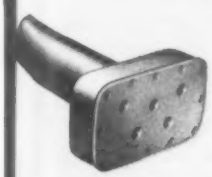
• SPEED •

All the work of handling core box and driers is done on the machine. Cartridges can be quickly loaded by hand. As many as 200 boxes are being blown and drawn by one operator in one hour.

• FLEXIBILITY •

With a Redford you can make any number of different cores without loss of time for change-overs. Here is what a large jobbing foundry has to say: "We are using 7 Redfords. Your development of the portable cartridge which can be made a part of the core box equipment, has given us all the advantages of core blowing without loss of flexibility so essential to us."

SEE DEMONSTRATION-BOOTH 1012



Sand Cartridges Available In 12 Standard Sizes

Blower comes complete, ready to use. Each blower provided with one Size "C" sand cartridge which is adaptable to a large range of core boxes. Cartridges are available in eleven additional standard sizes and special sizes furnished where needed.

WE HAVE THE "KNOW HOW" AND WILL ASSIST YOU IN SOLVING YOUR CORE BLOWING PROBLEMS

Redford IRON & EQUIPMENT CO.

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21315 W. McNICHOLS ROAD • DETROIT 19, MICHIGAN

FERROPHOSPHORUS APPLICATIONS

In Gray Iron Foundry Practice

IT IS generally recognized that certain of the properties of gray iron can be altered by varying the amount of phosphorus in the metal. An ideal method of increasing the phosphorus content of gray irons, according to a booklet recently published by Hickman, Williams & Co., Cleveland, is through the use of ferrophosphorus, an alloy of iron and phosphorus.

The text of the booklet goes on to state that probably the best known effect of phosphorus in gray iron is its ability to increase the fluidity of the metal. Castings of intricate and fine detail such as are required for hardware and ornamental work, are therefore more true to pattern and are sharper in detail when poured from high phosphorus content (up to 0.90 per cent P) metal. Large, thin-sectioned castings such as are used in the sanitary ware and radiator industries are much more readily cast from irons with up to 0.80 per cent P content.

Increases Section Size Sensitivity

Agricultural implement and machinery castings, especially when small and of light section, are much easier to run when poured with irons containing from 0.50 to 0.70 per cent P. Higher fluidity means less misrun and cold shut defects. Higher fluidity also means less pigged iron and cleaner ladles.

Phosphorus increases the sensitivity of the metal to section size changes and care should be exercised to avoid extreme changes in section size. Proper gating and risering will provide adequate feed metal to heavy sections adjacent to light sections and insure sound castings.

Gray irons containing up to 0.80 per cent P are commonly used in the manufacture of piston rings. The higher phosphorus content not only provides the necessary fluidity for these very light-sectioned castings but also gives markedly improved wear resistance. Increasing the phosphorus content of gray irons for use in rollers for rolling mills and in certain pipes and castings for handling abrasive materials has been found an aid in improving the wear resistance.

Another property of higher phosphorus content irons is their improved resistance to growth on repeated heatings to elevated temperatures. Stove part, grate bar, stoker link, firepot and furnace lining castings containing up to 0.75 per cent P show less tendency for growth upon repeated heatings than do irons of low phosphorus content. The higher amount of the phosphorus eutectic tends to prevent the penetration of oxidizing gases and thus retards the growth of the casting.

Cast iron pipes and fittings are normally cast from irons with phosphorus content up to 0.80 per cent.

Ferrophosphorus, is a reliable and convenient means of increasing the phosphorus content of gray irons. Available in two grades, the 22 per cent grade contains 22-23 per cent P, 4.00-2.20 per cent Si, and the 24 per cent grade contains 23-25 per cent P, 2.20-0.96 per cent Si. In both grades Mn ranges from 4.00-13.50 per cent, TC from 0.20-0.12 per cent and S is 0.001 per cent.

For foundry use it is crushed and screened to sizes suitable for additions to cupolas or furnaces and for ladle additions.

Prepared size ranges available in both 22 and 24 per cent grades and the recommendations for the use of each size are as follow: 3 x 2 in.—For additions to cupola charges, electric furnaces and air furnaces. 3/8 x 1/8-in. for forehearth additions and for additions to ladles of over 500 lb. metal capacity. 1/8 in. and below for additions to ladles up to 500 lb. metal capacity.

Ferrophosphorus is also available in lump form for convenience in making heavy additions to the cupola or furnace. It melts at a temperature of less than 2100° F, and thus goes into solution in the iron very readily. It is recommended, however, that whereever possible, additions be made to the cupola, furnace or other melting unit rather than to the ladle. Metal temperature losses sustained when ladle additions are made will thus be avoided. Recovery of phosphorus is practically 100 per cent, whether added to the cupola, to the furnace, or introduced as a ladle addition.

Listed in the accompanying tables are several typical cupola mixes containing ferrophosphorus as part of the cupola charge. It will be noted that even though the malleable grade of pig iron is used in each of these mixes, comparatively small amounts of ferrophosphorus are required to secure the desired phosphorus content in the metal. Additions of ferrophosphorus to the cupola charge will naturally have to be varied to compensate for scrap and pig iron of varying phosphorous content.

AGRICULTURAL IMPLEMENT AND MACHINERY CASTINGS

	Wt. Lb.	Si. %	Si. Lb.	P %	P Lb.
Pig Iron (Mall.)..	250	3.00	7.50	0.18	0.45
Silvery Pig	50	10.00	5.00	0.15	0.08
Ferrophosphorus ..	10	1.50	0.15	24.00	2.40
Returns	350	2.45	8.58	0.56	1.96
Cast Scrap	240	2.30	5.52	0.30	0.72
Steel Scrap	100	0.10	0.10	0.03	0.03
TOTALS IN LB.	1.000		26.85		5.64

Silicon: As charged, 2.69%; in castings, 2.45%.

Phosphorus: As charged, 0.56%; in castings, 0.56%.

SANITARY WARE AND STOVE PLATE CASTINGS

	Wt. Lb.	Si. %	Si. Lb.	P %	P Lb.
Pig Iron (Mall.)..	350	3.00	10.50	0.18	0.63
Silvery Pig	30	10.00	3.00	0.15	0.05
Ferrophosphorus ..	10	1.50	0.15	24.00	2.40
Returns	350	2.60	9.10	0.67	2.35
Cast Scrap	260	2.30	5.98	0.50	1.30
TOTALS IN LB.	1.000		28.73		6.73

Silicon: As charged, 2.87%; in castings, 2.60%.

Phosphorus: As charged, 0.67%; in castings, 0.67%.

FURNACE LININGS, FIREPOTS AND GRATE BARS

	Wt. Lb.	Si. %	Si. Lb.	P %	P Lb.
Pig Iron (Mall.).	200	2.25	4.50	0.18	0.36
Silvery Pig	60	10.00	6.00	0.15	0.09
Ferrophosphorus ..	10	1.50	0.15	24.00	2.40
Returns	350	2.00	7.00	0.56	1.97
Cast Scrap	180	2.30	4.14	0.40	0.72
Steel Scrap	200	0.10	0.20	0.03	0.06
TOTALS IN LB.	1.000		21.99		5.60

Silicon: As charged, 2.20%; in castings, 2.00%.

Phosphorus: As charged, 0.56%; in castings, 0.56%.

Chromium Content: (Optional), 0.50-1.25%.

Book Review

Conference Guide to Basic Management Training, by Arthur S. Hotchkiss, cloth, 206 pages, 8 x 10 in., published by National Foremen's Institute Inc., Deep River, Conn. Price $5.50.

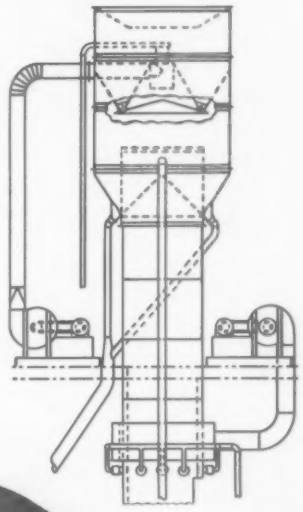
This detailed manual is intended to serve as a guide for the presentation of directed conference subjects in training of supervisory personnel. Its aim is to aid in the development of improved industrial supervisory practices. Suggested practices are broken down into ten basic management training sessions. Each session is organized around certain basic ideas which are related to each other in a progressively developed sequence to obtain the maximum value from the sessions and maintain a continuity of thought for the entire series.

Each of the ten sessions is divided into two parts making it possible to present the material in ten 2-hour sessions or twenty 1-hour sessions. Major elements in each session are titled and decimal numbered, and time allowances are scheduled in order to aid the person leading the conference to present the subject matter within the total time limit.

CUPOLA SPARK SUPPRESSOR

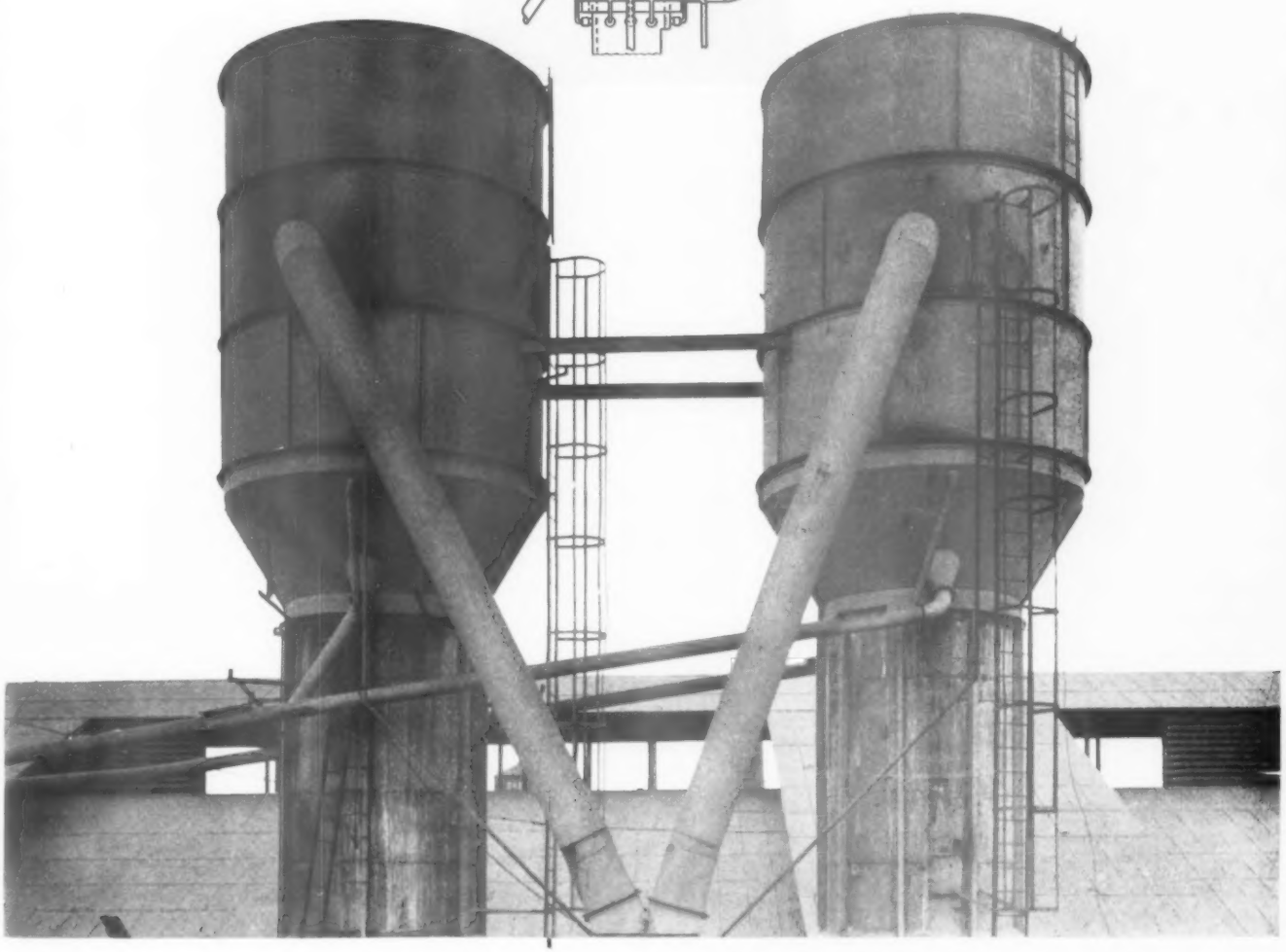
helps keep foundry roofs clean

Is smoke and ash from your cupola a neighborhood nuisance? Are flying sparks a fire hazard? Then you should know about the Whiting Hydro-Clone Dust and Spark Suppressor.



This wet collector reduces fly ash, sparks, and smoke well below the nuisance level . . . insures a clean roof, removes fire hazard, and lowers cost of roof maintenance.

Dust and sparks are reduced to harmless, easily disposable sludge; and the water is recirculated, holding operating costs at a minimum. Write for new Bulletin FY-152 fully describing this equipment.



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Greetings to the Foundry Industry from

Mr. Chas. C. Kawin and his Associates

Forty-five years ago this Company was founded on the idea of applying science to the production of castings. The result has been consistent improvement in the physical properties, structures, and quality of *control-produced* castings.

Progressive-minded foundrymen everywhere have our appreciation for their whole-hearted co-operation—and for the opportunity given us to serve this greatest and oldest of industries!

KAWIN SERVICES

Metallurgical Advisory
- Metallurgical Investigations
- Material Failures
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- Setting-up of Specifications
- Control Methods and Procedures
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Metallographic Service
- Structure Studies
- Grain Size Determinations
- Plating Thickness

Chemical Analysis
- All types of Metallurgical and Foundry Materials

Physical Testing
- All types of Physical Testing on ferrous and nonferrous metals

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Foundry Engineers • Chemists • Metallurgists

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OBITUARY

RUSSELL H. McCarroll, 58, director of chemical and metallurgical engineering and metallurgical research, Ford Motor Co., Dearborn, Mich., died Mar. 31, in Bay City, Mich., following a heart attack. Mr. McCarroll, a native of Detroit, was graduated from University of Michigan in 1914, with a degree in chemical engineering, and was granted an

RUSSELL H. McCARROLL

honorary degree of master of engineering by that university in 1937. He became associated with Ford Motor Co. in 1915. In 1918 he was in charge of chemical engineering at the Rouge plant, and from 1922 to 1944 was in charge of that department for all Ford plants. Mr. McCarroll was a member of the Detroit Chapter of the American Foundrymen's Association, and one of the association's national directors. He was a director of the Detroit Engineering Society and a member of the technical board of the Society of Automotive Engineers.

* * *

John Freer, 65, one of the founders of Machined Steel Casting Co., Alliance, O., died Mar. 22, following an illness of 4 years. Mr. Freer left American Steel Foundries in 1919 to join Machined Steel Casting Co. as treasurer and purchasing agent. Upon his retirement in 1944, he resigned those positions and that of secretary, remaining on the board of directors of the company.

* * *

James H. Herron, 73, internationally known consulting engineer and president of James H. Herron Co., Cleveland, died Mar. 29, in Fort Lauderdale, Fla. A native of Girard, Pa., Mr. Herron was graduated from University of Michigan. Prior to founding the engineering company which bears his name in 1909, he was vice president of the Bury Compressor Co., Erie, Pa., and held executive positions with Motch & Merryweather Co., and Detroit Steel Products Co., in Detroit. He was a former president of the American Society of Mechanical Engineers.

* * *

John G. Brown, 75, secretary of Wm. P. Laytham & Sons Co. Inc., Paterson, N. J., died Mar. 20, in Passaic General Hospital following a brief illness. A native of North Ireland, Mr. Brown came to this country in 1903. He was associated with the Eagle Iron & Brass Foundry Co., Passaic, and was made secretary in 1915. When that company and Wm. P. Laytham Co. consolidated in 1930, he became a director and secretary of the new organization.

* * *

Richard F. Jordan, 62, vice president in charge of sales, Sterling Wheelbarrow Co., Milwaukee, died Apr. 5, at his home there, following a long illness. Mr. Jordan, a native of Boone, Iowa, was graduated from Iowa State College. He left the sales staff of Hill-Clark Machinery Co., Chicago, and joined Sterling Wheelbarrow Co. in 1918, as district manager of its Boston office. In 1921 he was made assistant sales manager at the main office in West Allis, Wis.,

RICHARD F. JORDAN

and became sales manager in 1931. He has been vice president in charge of sales since 1946. An active member of the American Foundrymen's Association, Mr. Jordan has served as treasurer of its Wisconsin Chapter for the last 8 years.

* * *

Harry R. Shick, 63, general manager, the Jackson Iron & Steel Co., Jackson, O., died unexpectedly Mar. 27, following an illness of a few hours. Mr. Shick had extensive experience as a furnace man in the production of all grades of pig iron. He went to Jackson over 25 years ago after serving in a supervisory capacity with the U. S. Steel Corp., Pittsburgh Steel and Bethlehem Steel companies.

* * *

Milton S. Finley, who retired 2 years ago as manager of the Buffalo territory of Werner G. Smith Co., Cleveland, died Mar. 17, following a long illness. Mr. Finley, a native of Buffalo, developed an interest in the

MILTON S. FINLEY

foundry industry through association with his father, treasurer of the original Howard Iron Works, Buffalo. A pioneer in the development of core oil, he joined Werner G. Smith Co. upon its organization in 1914, as vice president. He was a member of the Western New York Chapter of the AFA and had served as one of its directors.

* * *

John W. Bache, 67, owner of the John W. Bache Co., New York, died Mar. 12 in East Orange, N. J. Mr. Bache, a native of St. Thomas, Virgin Islands, established the castings company over 40 years ago.

* * *

Thomas R. Allison, 86, vice president of the Acme Brass Foundry Co., Charleston, W. Va., died there Mar. 20. Mr. Allison was born in Scotland and had resided in Charleston since 1919.

* * *

R. F. Smith, 44, vice president, treasurer and general manager, Waukesha Foundry Co., Waukesha, Wis., died Apr. 4. Mr. Smith was the son of C. C. Smith, president of the company.

* * *

Harold A. Richmond, chairman of the board of directors and treasurer of the General Abrasive Co. Inc., Niagara Falls, N. Y., died Apr. 8.

75 Years of

Eben Jones, portrayed at left, became the second president of Globe Iron Company in 1887.

John E. Jones, portrayed at right, became the third president of Globe Iron Company in 1922.

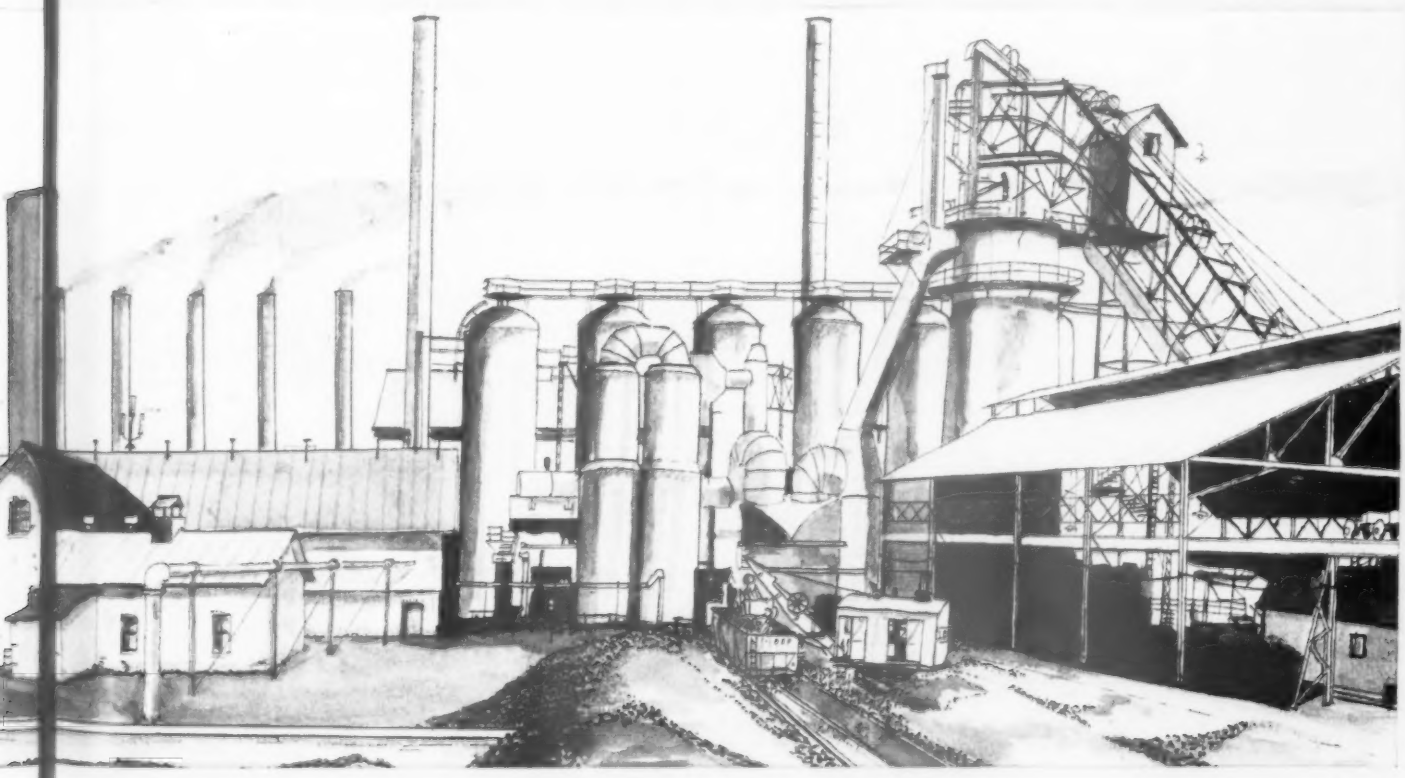
The illustration at lower left is of the "new" Globe furnace built in 1903; capacity 100 tons daily. To the right is shown the "New Globe" rebuilt in 1912 with 120 tons daily capacity.

GLOBE IRON

Operation!

When Globe Iron Company started operations in 1872 the famous "Hanging Rock" district of southeastern Ohio and northeastern Kentucky was based on local ores and local fuel (charcoal and soft non-coking coal). Not many years later the development of the coke fired hot blast furnace using the rich Mesabi ores started the decline of the Hanging Rock District. However, with careful management Globe survived. In the 1890's Globe Iron Company started specializing in the production of Silvery Iron and pioneered in introducing this material to the foundry trade. Its efforts in promoting Silvery were so successful that it soon produced this grade of iron exclusively and in 1903 built a new stack of much greater capacity to meet the increasing demand. In 1912 increasing business warranted rebuilding the new stack to increase the capacity and efficiency of operation. Globe pioneered in the field and is today the leading exclusive producer of Quality Blast Furnace Silvery.

GLOBE IRON COMPANY
75
JACKSON, OHIO



COMPANY JACKSON OHIO

ACTIVITIES OF FOUNDRY Groups

Eastern Canada and Newfoundland

NATIONAL Officer's Night was held by Eastern Canada and Newfoundland Chapter of the AFA Mar. 12 at Mount Royal Hotel, Montreal. William B. Wallis, national AFA vice president, spoke on AFA promotion in industry.

The winners of the technical papers contest held during the season presented their papers. Both papers were considered equally good and were awarded a first place tie.

Paul vonColditz, Canadian Car & Foundry Co. Ltd., Longue Pointe, Quebec, presented his paper, "Thermit Pipe-Eliminator for Steel Castings." The second speaker was A. H. Lewis, Dominion Engineering Works Ltd., Lachine, Quebec, and his paper was entitled "Immersion Thermo-Couple for the Iron Foundry." This paper was prepared with the assistance of C. A. Sebistianowich, Dominion Engineering Works Ltd. Both talks were illustrated with slides.

On Mar. 8 a group of 60 men met in Sherbrooke, Quebec, and held their first meeting, which might prove to be the birth of a new AFA chapter. Rene Belisle, J. A. Gosselin Co. Ltd., Drummondville, Quebec, was chairman and J. Kinsella, Union Screen Plate Co., Lennoxville, Quebec, was secretary.

Guest speakers were Henry Louette, Warden King Ltd., Montreal, who spoke on "Foundry Control," and A. E. Cartwright, Crane Ltd., Montreal, who presented a history of AFA activities and the purpose of the association in the foundry industry.—*H. E. Francis, Jenkins Bros. Ltd.*

Birmingham

THE annual quiz program held by Birmingham District Chapter of the AFA Mar. 19 was attended by over 100 members and guests. National Director-elect Tom H. Benners Jr., T. H. Benners & Co., Birmingham, was quiz master.

Members of the board of experts, all of Birmingham, were: C. P. Caldwell, president, Caldwell Foundry & Machine Co. Inc.; Dr. R. W. Sandelin, chief metallurgist, and Norman E. Pugh, gray iron foundry superintendent, Stockham Pipe Fittings Co.; J. R. Kottus, chief metallurgist, Anderson Brass Works Inc.; James A. Bowers, melting superintendent, Frank H. Coupland, foundry superintendent and Charles K. Donoho, chief metallurgist, American Cast Iron Pipe Co.; W. H. Spencer, sales engineer, DeBardeleben Coal Corp., and H. W. Gethin, vice president, Alabama Clay Products Co.

Advantages and disadvantages of converter steel and electric furnace steel were briefly outlined by Mr. Caldwell. Refractories questions were handled by Mr. Gethin. In answer to a question on the short life of the mixing ladle, he recommended that a high grade mortar mix be used when lining the ladles. The joint is the weakest point of the lining and should have special attention.

Examination of a casting by the experts to determine the cause of warping, thickness and thinness, brought out much discussion and a number of suggestions for eliminating the difficulty.

Mr. Coupland handled the questions on sand. The merits of seacoal were given a thorough and enlightening going over during the evening.

As each man asked a question, his name was written on a piece of paper and dropped into a ballot box. At the conclusion of the discussion period a drawing was held, and the cash prize was won by Joe T. Gilbert, Stockham Pipe Fittings Co.—*J. P. McClendon, Stockham Pipe Fittings Co.*

Southern California

SOUTHERN California Chapter of the AFA had as technical speaker at its March meeting, Charles F. Scherer, general manager, Davenport Machine & Foundry Co., Davenport, Iowa.

Mr. Scherer said that molding machines must be given a fair chance if they are to do a proper job; sand handling must be adequate; conveyor systems, though not necessary, must be linked with the machine's operation, and above all, flasks must be the correct size for the machine.

Use of molding machines, he went on to say, does not necessarily presuppose mechanization throughout; however, the greater general foundry efficiency, the more successful castings will come from use of the proper machine.

(*Continued on page* 220)

EASTERN CANADA & NEWFOUNDLAND Chapter of the AFA celebrated national officers' night Mar. 12 at Mount Royal Hotel, Montreal. Members and guests are shown as they listened to W. B. Wallis, national AFA vice president, and the two technical speakers featured on the program

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CENTRAL ILLINOIS Chapter of the AFA and the Peoria Chapter of the American Society for Metals held a joint meeting at Jefferson Hotel, Peoria, Ill., Mar. 8. Shown above are, left to right: AFA Chapter Chairman A. V. Martens, Pekin Foundry & Mfg. Co., Pekin, Ill.; Speaker E. J. Wellauer, superviser of research, Falk Corp., Milwaukee; T. Logan, ASM chapter chairman, and A. W. Johnson, Caterpillar Tractor Co., Peoria, Ill.

(*Continued from page* 218)

Victor Barton, vice president, Triplett & Barton Inc., industrial analysts, outlined the apprentice training program. Patternmaking classes are growing rapidly, but coremaking and molding students are harder to enroll.

The coffee talk was by Harry E. Kunkel, chief inspector, Los Angeles County Air Pollution District.—*Maurice Beam.*

Central Illinois

CENTRAL Illinois Chapter of the AFA and the Peoria Chapter of the American Society for Metals held a joint meeting at Jefferson Hotel, Peoria, Ill. Mar. 8. E. J. Wellauer, supervisor of research, Falk Corp., Milwaukee, spoke on "Welding Process in the Manufacture of Steel Castings."

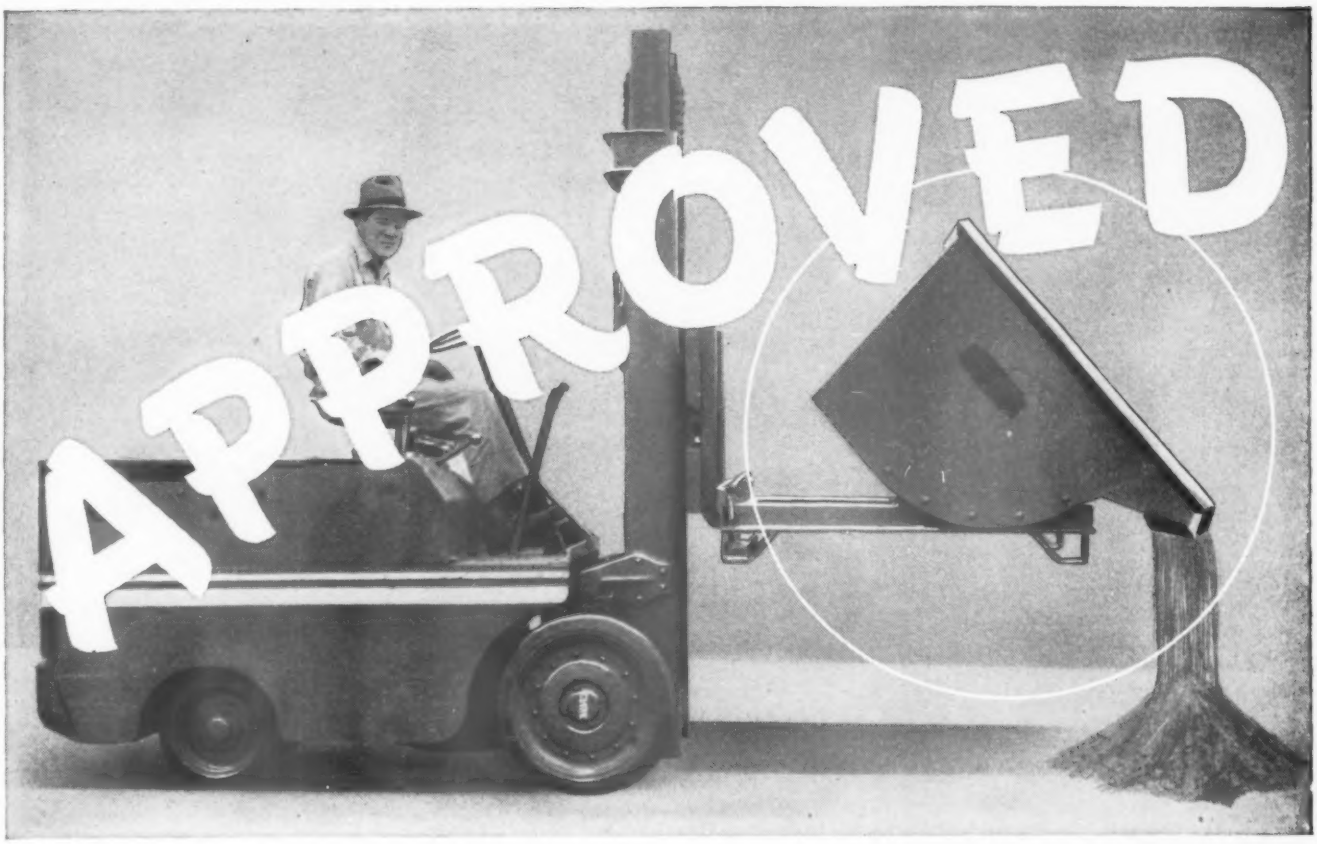
Mr. Wellauer's talk, which he illustrated with slides, was divided into three sections directed to the metallurgist, the designer and the engineer. He stressed the most economical method of manufacture of various types of machines, comparing welded steel plate, steel plate welded to steel castings and steel castings alone. Graphs were shown of tests and results of different types of welding rod on different types of parent material. A. W. Johnson, Caterpillar Tractor Co., Peoria, was technical chairman.—*V. W. Swango.*

Michiana

MICHIANA Chapter of the AFA heard H. M. St. John, superintendent of brass foundries, Crane Co., Chicago, speak on "Quality Control in the Nonferrous Foundry" Mar. 2 at Elkhart Hotel, Elkhart, Ind.

(*Continued on page* 222)

SOUTHERN CALIFORNIA: Views of the Southern California Chapter of the AFA February meeting are shown above. At upper left, left to right, are: Henry E. Russill, Eld Metal Co. Ltd., Los Angeles, chapter president; Charles A. Barnett, Foundry Equipment Co., Cleveland, technical speaker of the evening, and Robert Gregg, Reliance Regulator Corp., Alhambra, Calif., national AFA director



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(*Continued from page* 220)

The speaker urged that a systematic check be made covering inspection of cores, rough testing and casting appearance to maintain metal quality. He considered test bar specifications and uniformity in dimension for production machining as essential to good work.

Mr. St. John outlined the causes of defective castings, the principal ones being faulty pattern equipment, faulty layout, faulty molding and improper sand and cores. Delving into the problems in jobbing foundries, he enumerated difficulties encountered through short runs and irregularity of castings, both in size and weight. He recommended the use of a card index for each part, listing defects, temperatures of metal and general conditions at the time the casting was made to avoid repetition of difficulties.

The Elkhart members of the chapter provided refreshments before the meeting, and presented a program of singing by The Doctors of Harmony, a nationally known quartet.—*S. F. Krzeszewski, American Wheelabrator & Equipment Corp.*

PHILADELPHIA Chapter of the AFA held its annual meeting at Franklin Institute, Philadelphia, Mar. 12. Speaker for the meeting, Alfred M. Bailey, director, Colorado Museum of Natural History (upper right) was introduced by Dr. H. G. Clamer, president, Ajax Metal Co. (upper left). Officers of the chapter are shown in center view, and directors at bottom

Philadelphia

PHILADELPHIA Chapter of the AFA celebrated Nonferrous Night in a meeting, Mar. 12, at Franklin Institute, Philadelphia. Alfred M. Bailey, director, Colorado Museum of Natural History, Denver, presented a motion picture and lecture entitled "Mormon Land."

He told the story of Padre Escalante, the first white man to explore Utah, and told how the Salt Lake Valley was converted from a desert to an inland paradise by the Mormons. The picturesque scenes of Zion and Bryce Canyons were outstanding. Climax of the show was an imaginary trip by boat under guidance of Norman Neville, down the deep canyon of the San Juan into the Colorado River, shooting rapids and visiting the historic Rainbow Bridge and the Crossing of the Fathers.

At the Feb. 13 meeting held at the Engineers Club, Philadelphia, 150 members and guests heard Warner Finster, metallurgist, American Chain & Cable Co., Reading Foundry Division, Reading, Pa., speak on "The Value of Simple Controls in the Foundry."

Mr. Finster covered major operations of successful foundry management. He explained the theory of the various controls and the application of this theory in his shop.—*Jack Furey, Swan-Finch Oil Corp.*

Western New York

REGULAR meeting was held by Western New York Chapter of the AFA at Hotel Touraine, Buffalo, Mar. 5, with about 85 present. National AFA Vice President William B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, remarked briefly on present European foundry practice and then stressed the problems confronting the AFA and the foundry industry.

Technical Speaker John B. Caine, metallurgist, Sawbrook Steel Casting Co., Lockland, O., spoke on "Scabs, Buckles and Spalls." He spoke of the lack of definite relationship between present laboratory testing technique

(*Continued on page* 225)

MONEY SAVING TOOLS

Layouts, drawings, specifications, bills of material. These documents, prepared by Giffels & Vallet, Inc., represent condensed experience gained in engineering foundry projects for more than twenty years. They are the plan of attack for building toward lower production costs. They are the tools used to acquire competitive prices on equipment, materials, and construction labor. They represent design in which the engineering has been integrated so that delays and costly field changes are eliminated. These tools are available to you for the development of your plans for new foundries or for expansion and modernization programs.

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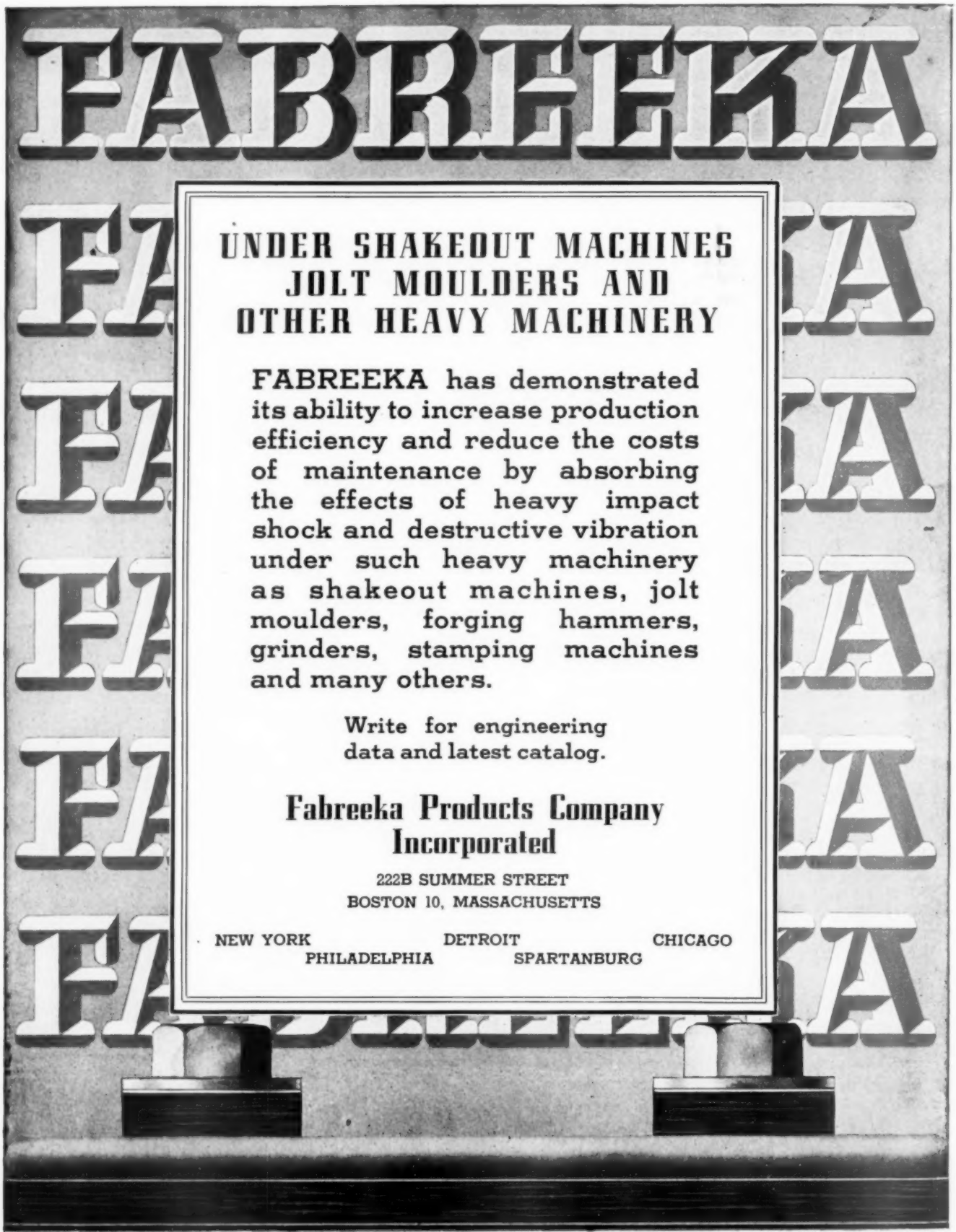
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(*Continued from page* 222)

and what actually happens in the making and pouring of the mold in production.

His talk was illustrated with slides and charts showing the results and the adaptation of more practical means of estimating the value of a given sand or core by subjecting the specimens to the reflected heat of molten metal and by partial and repeated immersion of the specimen.

Mr. Caine stressed the desirability of having a sand composition which will produce a glazed or vitrified surface on the sand. He stated that with the correct sand composition, the most important control factor is moisture held to one half per cent variation and uniform ramming.—*Fred L. Weaver, Weaver Materiel Service.*

Metropolitan

MARCH meeting of Metropolitan Chapter of the AFA was designated National Officers' Night with National AFA President Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.; William W. Maloney, AFA secretary-treasurer, Chicago, and the following national directors attending: H. A. Dean, American Brake Shoe Co., New York; H. G. Lamker, Wright Aeronautical Corp., Woodridge, N. J., and John M. Robb Jr., Hickman, Williams & Co., Philadelphia.

Mr. Kuniansky, in a short opening talk on current foundry problems, said that foundries are doing an excellent job with the materials available today. Also he said that management has become aware of the fact that, regardless of materials and equipment, a proper training program for employees is essential.

Mr. Maloney advised that all foundrymen should make early plans to attend the national convention in Philadelphia.

Thomas Curry, Lynchburg Foundry Co., delivered the technical address of the evening on the subject "Chemically Treated Sands." According to Mr. Curry, proper utilization of chemically treated sands requires a great deal of control work. Binders in amounts equal to about a quarter of the amount used in synthetic sands are used. He went on to say that high mold hardnesses and mold strengths can be developed to permit deep draws and much better finishes, thus reducing cleaning costs.

His talk was illustrated with slides showing grain distribution of the sands and photographs of some of the castings produced.—*W. H. Ferguson, Electro Metallurgical Sales Corp.*

Tri-State

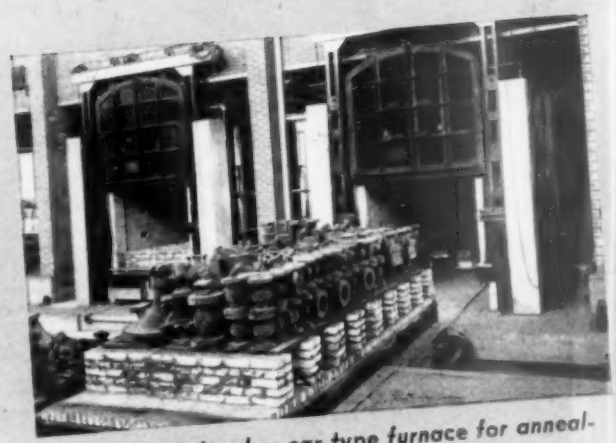
TRI-STATE Chapter of the AFA held its regular monthly meeting Mar. 19 at Mayo Hotel, Tulsa, Okla. H. L. Smith, chief metallurgist, Federated Metals Division, American Smelting & Refining Co., Pittsburgh, spoke on "Problems Connected with the Melting of Brass and Bronze."

Although the meeting was devoted to nonferrous metals, Mr. Smith's talk brought many questions from the iron and steel men. The speaker stressed the importance of dissolved gases in nonferrous metals, the chemical reactions concerned, and several methods of eliminating the detrimental results. By simple diagram, Mr. Smith illustrated the harm done by very small percentages of moisture

(*Continued on page* 228)

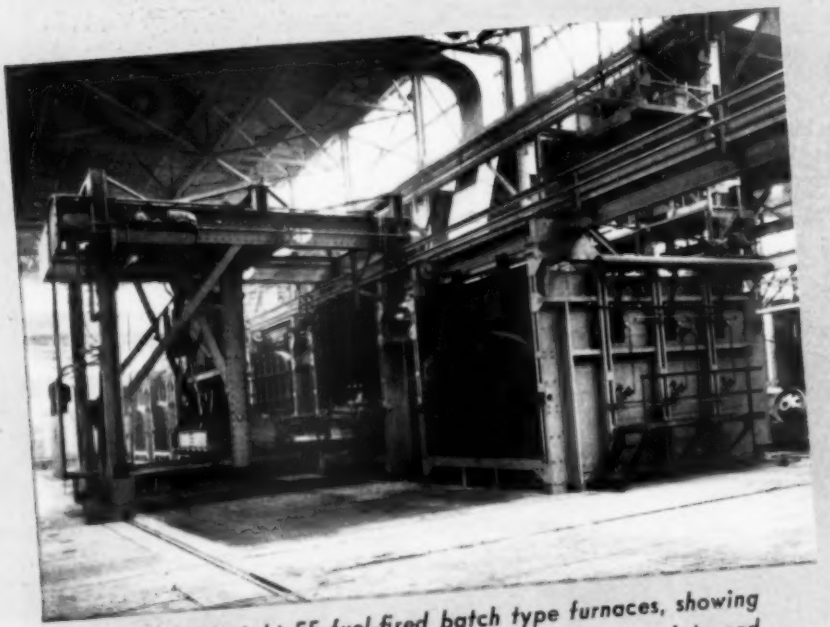
TRI-STATE Chapter of the AFA met at Wilder's Restaurant, Joplin, Mo., Feb. 20. Speaker's table is shown at upper left. Left to right, are: Speaker Willam B. McFerrin, Electro Metallurgical Sales Co., Detroit; Chapter Chairman R. W. Trimble, Bethlehem Supply Co., Tulsa, Okla.; B. P. Glover and E. J. AuBuchon, M. A. Bell Co., Tulsa. Upper right, dinner guests and speaker's table. Lower left, left to right, Mr. Glover and Clyde Beagle, Webb Corp., Webb City, Mo. Lower right, left to right, H. J. Pfeifer, Electro Metallurgical Co., Mr. McFerrin and Mr. Trimble

EF oil-fired continuous roller hearth furnace for the cycle annealing of large castings. Capacity 6600 lbs. per hour to 1650° F.



EF double chamber car type furnace for annealing castings, equipped with three furnace cars and one transfer car incorporating car puller.

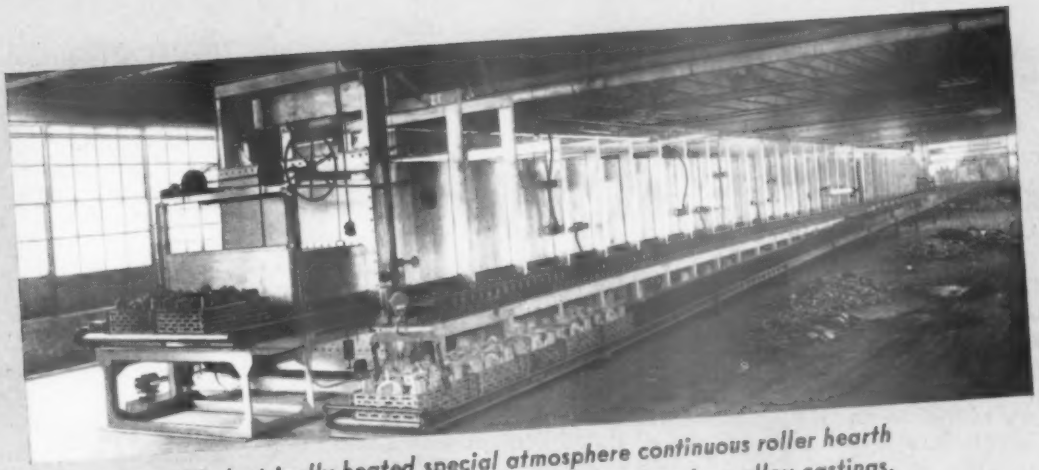
EF



Battery of eight EF fuel-fired batch type furnaces, showing gantry crane that handles the large, heavy castings into and out of the furnace and quenching equipment.

Two EF roller rail pusher type short cycle malleablizing furnaces—capacity 40,000 lbs. of scale-free finish annealed malleable castings per day.

EF electrically heated two-chamber car type furnace for annealing and heat treating alloy steel castings, equipped with three furnace cars and motor driven transfer car.



EF electrically heated special atmosphere continuous roller hearth furnace for the scale-free annealing of various iron alloy castings.

Gas, oil and electric furnaces for all foundry annealing and heat treating requirements

Two EF combination gas and oil fired continuous roller hearth furnaces that anneal 14000 lbs. of brake drums and other castings per hour—

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GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION

Salem-Ohio

(*Continued from page* 225)
and gases when melting brass and bronze. Considerable time was given to the importance of correct and proper methods of gating and risering.—*Fred E. Fogg, Acme Foundry & Machine Co.*

New Jersey

THE EVOLUTION of the Russian Menace" was discussed by Ralph E. Heinzen, publisher and editor of the *Bellevue Times* and the *Nutley Sun*, two newspapers of northern New Jersey, at the dinner meeting of New Jersey Foundrymen's Association, Mar. 15, at Military Park Hotel, Newark, N. J.

As one who had spent 25 years in Europe as a United Press foreign and war correspondent, he spoke with considerable authority. He regarded the Russian menace as being serious and was concerned over what he believed to be the complacency of citizens of this country in the face of this threat. He urged immediate strengthening of the military services, speedy action on the European Recovery Program, and is convinced the only way a war can be averted is by developing a sound preparedness program.

E. W. Wollmuth, executive vice president, Newark Chamber of Commerce, discussed briefly state legislation under consideration at Trenton, N. J., with particular reference to a new tax program, including proposals for a gross sales tax and a personal property tax.

W. Robert Bull, New Jersey state Chamber of Commerce, spoke on bills recently introduced in the state legislature to provide for cash sickness benefits and also to improve procedure in the administration of unemployment insurance. He is opposed to the state getting deeply into the insurance business, and believes insurance should be handled by private companies under state direction —*B. K. Price.*

NORTHWESTERN Pennsylvania Chapter of the AFA celebrated Malleable Night at the Moose Club, Erie, Pa., Feb. 23. At top is a view of the speakers' table; a general view of the group is shown in the center, and a group of supervisors from the Erie General Electric Co. foundry is shown below

Ohio State

OHIO State University Chapter of the AFA heard H. W. Lownie Jr., Battelle Memorial Institute, Columbus, O., speak on "Foundry Coke Characteristics" Mar. 6. Mr. Lownie gave a brief summary of coke production and consumption in various industries and said that foundries consume about 3 per cent of total U. S. coke production.

In discussing the usual and special tests of coke, the speaker said that although foundries run tests on coke, they cannot predict the manner in which it will react in the cupola. Mr. Lownie's work is leading to the goal that foundries can order coke by specification and know how to use that coke in the cupola.

He went on to say that coke, today, is not the same quality as prewar coke, because high quality coking coals are unavailable. Consequently, coke users must learn to utilize lower quality coke. He said that foreign countries have advanced much in the use of inferior cokes.—*Eldon Boner.*

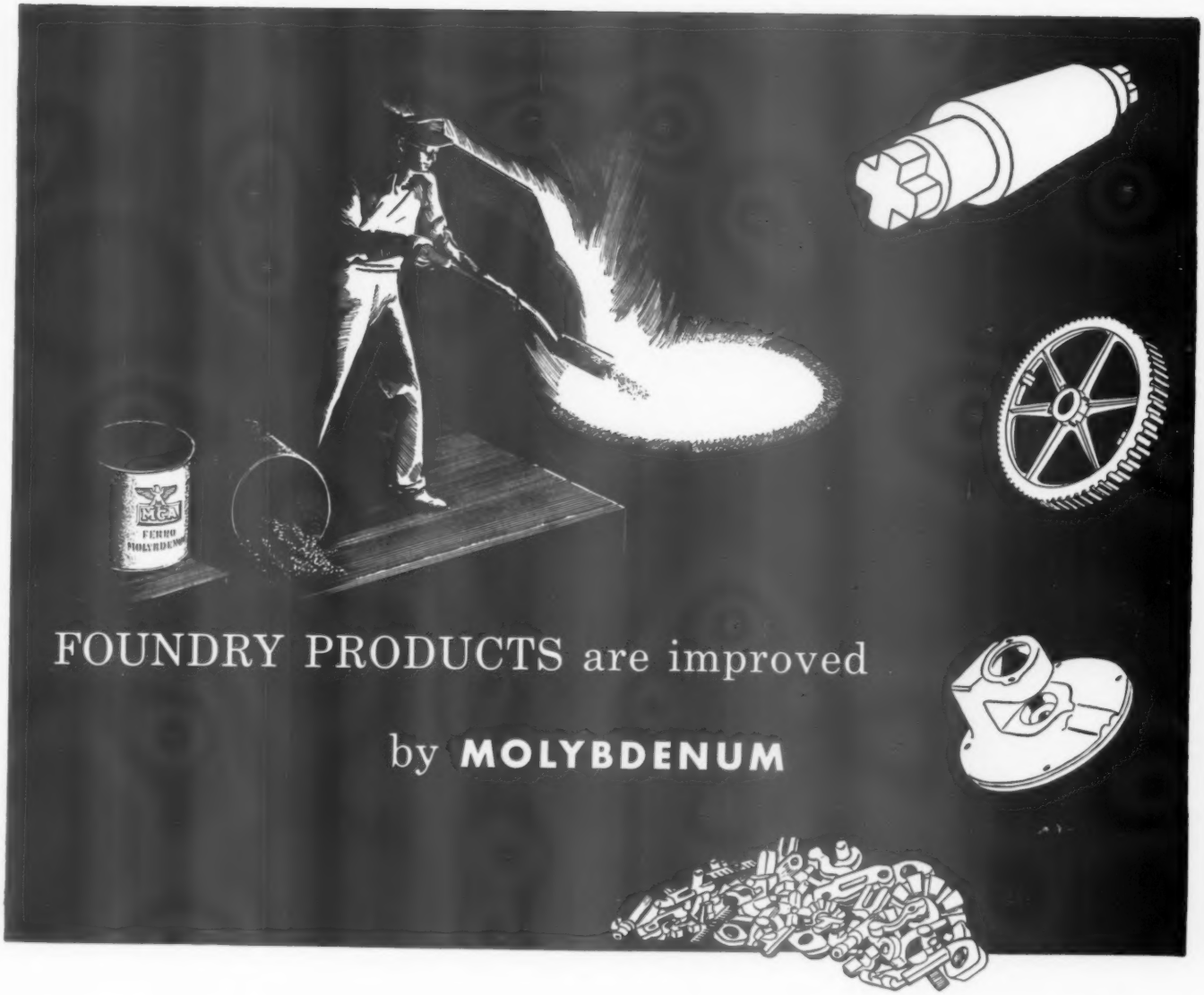
Central New York

BRUCE L. SIMPSON, president, National Engineering Co., Chicago, was the principal speaker at the Mar. 12 meeting of Central New York Chapter of the AFA at Onondaga Hotel, Syracuse, N. Y. His "History of the Foundry Industry," illustrated with slides, provided an interesting and educational evening.

Mr. Simpson stated that nations have been as successful as their interest in metallurgy. As this interest faded, the nation lost its place as a world power. Thus the history of molten metals follows the rise in power of the Chinese, Phoenicians, Egyptians, Greeks, Romans and the various European powers down through Medieval times.

Some interesting facts that are little known concerning the United States were brought out. Paul Revere, besides being famous for his historic ride, also was a foundryman and one of the original owners of Revere Copper & Brass Co. Pig iron was a contributing cause of the Revolutionary War because England de-

(*Continued on page* 232)



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Where uniform strength in light and heavy sections is important . . .

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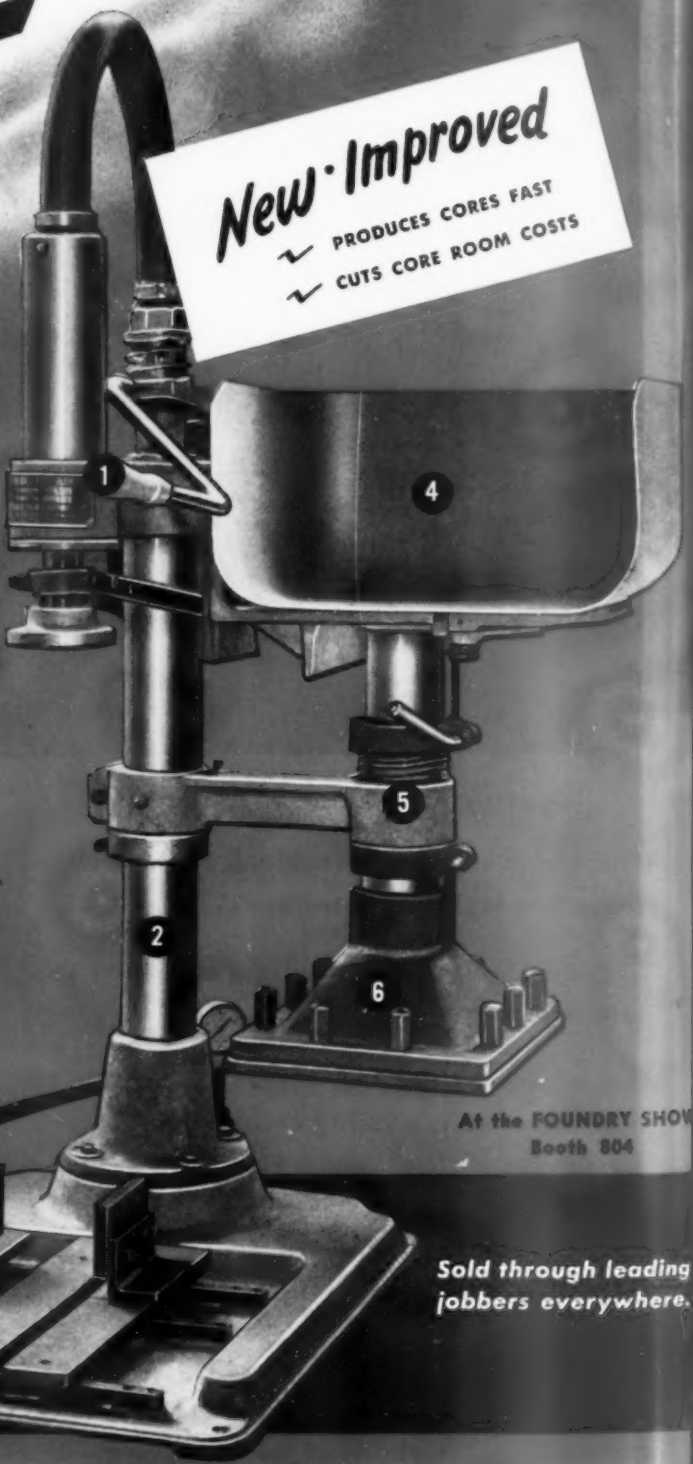

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Operators like the Randall because they can blow several boxes with one filling of the sand magazine. The Randall reduces operator fatigue and ups production.

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At last, you can have a *top fired* crucible furnace which combines TWO furnaces into ONE complete production unit. Randall-Twin pays for itself.

Twin melting furnaces are interconnected. While top firing one of the twin furnaces "A," the charge in the crucible of furnace "B" is being preheated by waste heat from "A." After pouring and recharging the crucible in "A," furnace "B" is top fired thus reversing the process and the charge in furnace "A" is preheated.

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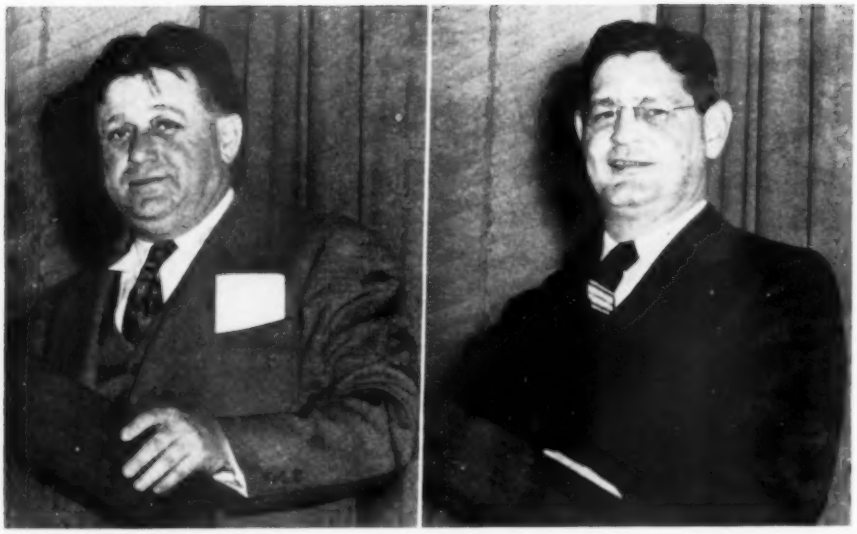


CINCINNATI DISTRICT Chapter of the AFA held National Officers' Night Mar. 9 at Engineering Society Headquarters, Cincinnati. National AFA President Max Kuniansky, vice president and general manager, Lynchburg Foundry Co., Lynchburg, Va., shown at left above, gave a short talk. Technical speaker at the meeting was Thomas Curry, metallurgist, Lynchburg Foundry Co., above at right

(*Continued from page* 228)
manded that all pig iron produced in the colonies should be shipped to the mother country for fabrication, and prohibited its use in the colonies. Valley Forge was noted as a casting center as well as for the place where George Washington and his troops spent a trying winter.

One of the most interesting slides showed molds being placed on conveyors and carried to pouring stations at a Westinghouse foundry in the 1880's. It illustrated that mechanization is not a new innovation.—*John A. Feola, Crouse Hinds Co.*

CENTRAL OHIO Chapter of the AFA heard an address by W. B. McFerrin, Electro Metallurgical Co., Detroit, at its March meeting. At top, left to right, are: Norman Dunbeck, Eastern Clay Products Inc., Jackson, O.; Fred Fuller, National Engineering Co., Columbus, O.; Mr. McFerrin; Joseph A. Park, dean of men, Ohio State University, Columbus, coffee speaker at the meeting, and Ray Frank, Bonney-Floyd Co., Columbus, chapter chairman. At bottom is a view of the speakers' table. Photos by W. H. White, Jackson Iron & Steel Co.

Central Ohio

CASTING Defects" was the subject for discussion at the March meeting of Central Ohio Chapter of the AFA. Main address was by W. B. McFerrin, Electro Metallurgical Co., Detroit, who stated that a reduction in foundry scrap of 1 per cent would result in a saving of about $25 million a year.

Typical casting defects were illustrated by a series of slides, and the factors responsible for each were discussed. Metal pouring was shown to be a major contributing factor to many types of scrap.

Mr. McFerrin went on to say that management has an important responsibility in reducing scrap. "Buck passing" and inadequate planning were stated to be major fundamental causes of a large percentage of scrap produced in foundries. More definite action, a more realistic viewpoint by management and adequate personnel training could be expected to materially reduce scrap losses.

Joseph A. Park, dean of men, Ohio State University, and once a foundryman, entertained with a coffee talk made up of a series of Scotch stories. —*H. W. Lownie Jr., Battelle Memorial Institute.*

Cincinnati

CINCINNATI District Chapter of the AFA held National Officers' Night Mar. 9 at Engineering Society Headquarters, Cincinnati. Approximately 125 members and guests were present to hear National AFA President Max Kuniansky, vice president and general manager, Lynchburg Foundry Co., Lynchburg, Va., deliver a short talk during which he pointed out that inasmuch as American foundry equipment manufacturers devote their full time and effort to the developing and manufacture of foundry equipment they have placed American foundries in a much more enviable position than those of the European countries where foundries are forced to develop and build most of their own equipment.

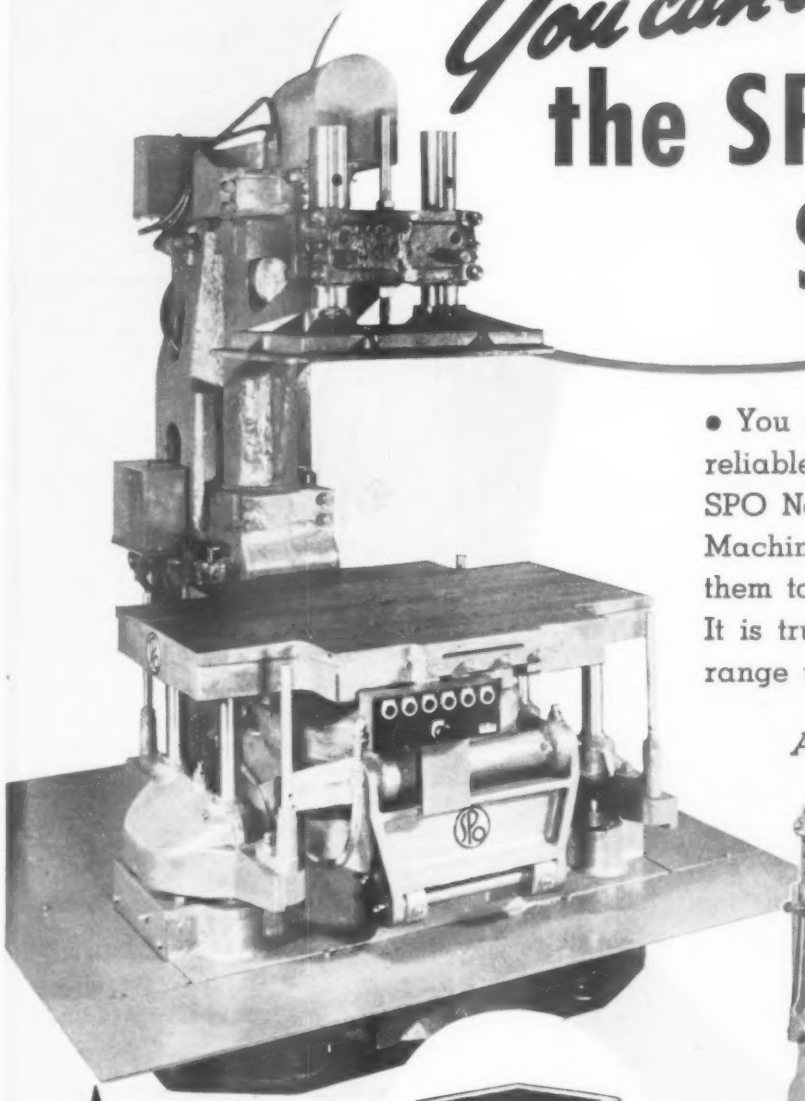
The technical address was by Thomas Curry, metallurgist, Lynchburg Foundry Co., who talked on chemically treated sand. He said that during the 15 months that Lynchburg Foundry has used such a sand, it has realized the following benefits: Better shakeout, toughness or strength

(*Continued on page* 234)

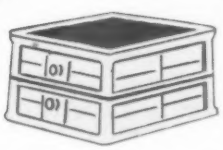
FOR ENDURANCE AND LONG LIFE CONSIDER SPO MOLDING MACHINES

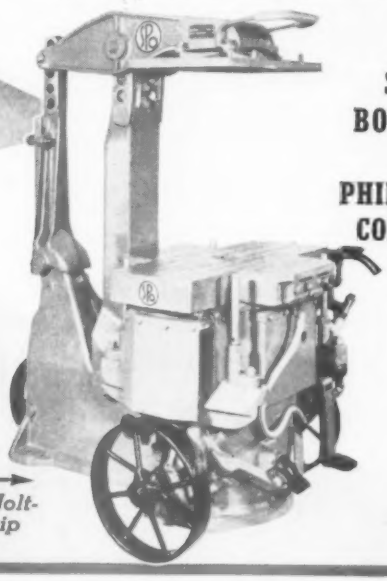
For Making Copes or Making Drags...

You can't beat the SPO No. 200 Series



SPO 2222 Jolt-Squeeze-Strip Machine





SPO 2136-G Jolt-Squeeze-Strip Machine

• You simply can*not* beat the steady, reliable performance of these long-lived SPO No. 200 Series Jolt Squeeze Strip Machines. This is true, whether you use them to make copes or drags or both. It is true, likewise, throughout a wide range up to 2500 pounds.

★ ★ ★

Ask for full information.

See us at BOOTH 1027 at the PHILADELPHIA CONVENTION

MEMBER

SPO INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE · · CLEVELAND 5, OHIO

TYPE CS, illustrated above, is priced at $270.00 complete, and is one of several available types.

Ask Your Supplier to Quote on a Combs Great Western Riddle

Delivery within 10 days on this model or any other models. A good riddle *will* save a lot of man-hours and Combs Riddles have always been a real, labor-saving investment in the foundry.

MADE ESPECIALLY FOR FOUNDRY USE BY

GREAT WESTERN MANUFACTURING CO.

LEAVENWORTH, KANSAS

★

COMBS GYRATORY FOUNDRY RIDDLES

(*Continued from page* 232)

of molds at low moistures with good flowability, reduction in cleaning costs, reduction in sand preparation time and in materials, pouring a greater range of castings in one sand, sand costs comparable with those of synthetic sand mixes, maintenance of cleaner sand handling equipment and favorable reaction of personnel.

E. C. Hoenicke, general manager, Foundry Division, Eaton Mfg. Co., Detroit, addressed 87 members and guests of the chapter Feb. 9. He

E. C. HOENICKE

traced the development of methods and equipment in the permanent mold process for producing gray iron castings. He emphasized the fact that permanent mold gray iron castings are applicable to a limited field, where any or all of the following requirements are necessary—free machinability; dense, porous-free structure; close limits, no growth or distortion and ability to take high finish.

He added that the maximum weight of a single casting is 10 lb and section thickness is limited to 1¼ in. maximum.—*C. H. Fredricks, Cincinnati Milling Machine Co.*

Twin City

MORE than 200 members and guests of the Twin City Chapter of the AFA attended the chapter's Mar. 4 meeting. S. D. Martin and S. W. Healy, Central Foundry Division, General Motors Corp., Saginaw, Mich., presented a talk and demonstration on "Progress for Better Methods."

While Mr. Healy spoke, Mr. Martin demonstrated examples of improvement in foundry output through

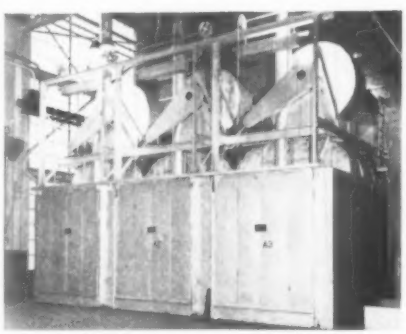
(*Continued on page* 236)

RECOGNITION OF OVEN LEADERSHIP

IMPORTANT CONCERNS LIKE THESE USE CARL-MAYER OVENS

Aluminum Co. of America
American Brake Shoe Co.
American Radiator Co.
Brown Industries
Bucyrus-Erie Co.
Crucible Steel Castings Co.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
General Electric Co.
General Motors Corp. and Subsidiaries
Gilbert & Barker Co.
General Steel Castings Co.
Golden Foundry Co. Inc.
Henry Kaiser Corp.
W. O. Larson Foundry Co.
F. E. Meyers & Bro. Co.
Oil Well Supply Co.
H. B. Salter Co.
Shenango Penn Mold Co.
Studebaker Corp.
Union Brass & Metal Mfg. Co.
A. C. Williams Co.
Whiten Machine Works
Whiting Corp.

CARL-MAYER VERTICAL OVEN. Now in operation at Kaiser-Frazer Automotive Parts Plant.



CARL-MAYER RACK TYPE OVENS. A recent installation for Large Aluminum Co.

This Picture

AN ACHIEVEMENT AND A PROMISE...

by CARL-MAYER

AN ACHIEVEMENT. You will agree that it takes outstanding results to build up the preference that leaders in the foundry industry show for Carl-Mayer Core and Mold Ovens . . . *Carl-Mayer Creative Engineering* has brought forth a series of important developments in foundry oven design and construction, that have added to speed and uniformity of baking and reduced fuel and maintenance cost.

A PROMISE. Whatever your core or mold baking problem may be, you can depend on Carl-Mayer Ovens for the same high calibre of performance that "leaders prefer".

SERVING FOUNDRY INDUSTRY FOR MORE THAN 28 YEARS.

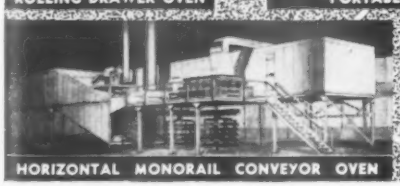
Write for Bulletin showing all types of Carl-Mayer Core and Mold Ovens.

ROLLING DRAWER OVEN

PORTABLE RACK OVEN

VERTICAL OVEN

CAR TYPE OVEN



HORIZONTAL MONORAIL CONVEYOR OVEN

The CARL-MAYER *Corp.*

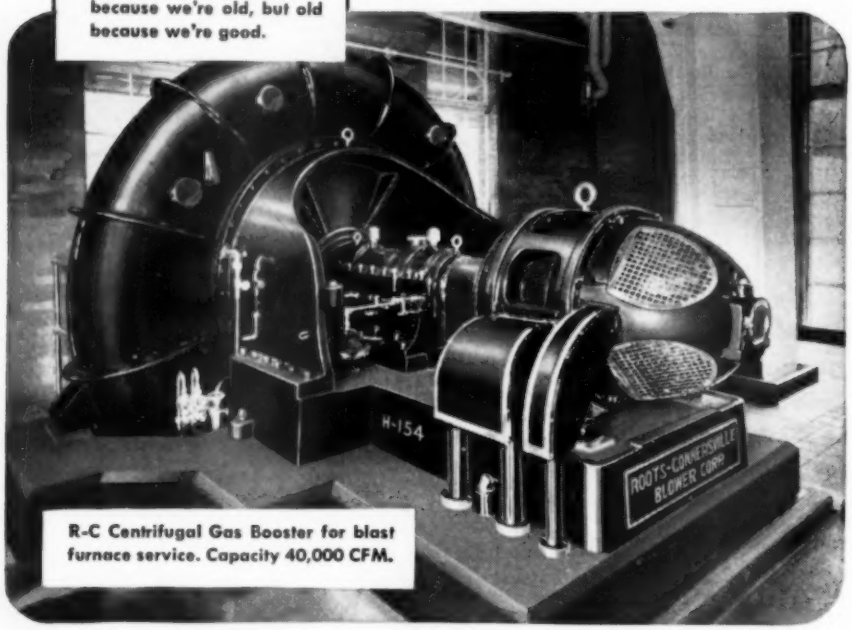
3030 EUCLID AVE., CLEVELAND, OHIO

CORE AND MOLD OVENS

Oil was first produced by drilling in 1859, five years after the first Roots Blower was built. We're not good because we're old, but old because we're good.

NO "HEDGING" ON BLOWER QUESTIONS FROM

R-C dual-ability



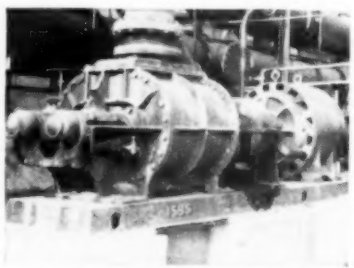
R-C Centrifugal Gas Booster for blast furnace service. Capacity 40,000 CFM.

When you ask Roots-Connersville sales engineers about blowers, exhausters or gas pumps for blast furnace or other steel plant applications, you'll get unbiased answers, without "hedging" between Centrifugal or Rotary Positive equipment.

That's because of our *dual-ability* to design and build both types. We recommend whichever is best suited to the specific application, and are the only blower builders that can offer you this important *dual choice* . . . an exclusive advantage which usually saves time, money and trouble.

You'll obtain outstanding performance from R-C equipment, too . . . the result of 94 years of experience, plus initiative and advanced thinking of alert engineers and designers.

So, for any problem of handling or measuring gas or air—consult R-C *dual-ability*.



R-C Rotary Positive Gas Pump in steel plant service. Capacity 3,000 CFM.

ROOTS-CONNERSVILLE BLOWER CORPORATION
805 Alabama Avenue • Connersville, Indiana

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ROTARY CENTRIFUGAL
BLOWER BUILDERS R-C SINCE 1854
BLOWERS • EXHAUSTERS • BOOSTERS • LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

• • ONE OF THE DRESSER INDUSTRIES • •

(*Continued from page* 234)

the use of motion study. A motion picture taken at the General Motors Saginaw Plant compared the old and new methods of production under actual foundry conditions. The use of double matchplates, mechanical weight shifters, elevated tumbler mills, and double box blowing was portrayed on the screen.—*O. J. Myers, Werner G. Smith Co.*

No. Illinois and So. Wisconsin

NORTHERN Illinois and Southern Wisconsin Chapter of the AFA celebrated the Valentine season with an informal dinner party for foundrymen, wives and sweethearts, Feb. 10 at Faust Hotel, Rockford, Ill. E. A. McFaul, Northwestern University, Chicago, addressed the group on the subject, "How Is Your Sense of Humor?"—*Carl Dahlquist, Greenlee Bros. & Co.*

Detroit

WINNERS of the apprentice patternmakers contest, sponsored by the Detroit Chapter of the AFA, were announced recently by Willard E. Kidwell, Packard Motor Car Co., and head of the contest committee. First prize and the "Skip" Miller Award went to John McKay, Apex Pattern & Engineering Co. Robert Wunsche, City Pattern Foundry & Machine Co., won second prize, and third prize was won by Rolande Materne, Peerless Pattern Works.

A total of 51 patternmaker apprentices entered the contest. Of this number, 26 finished their patterns.—*C. J. Rittinger, American Car & Foundry Co.,*

Texas

EUGENE E. BALLARD, chief engineer, Development and Installation Division, Lester B. Knight Associates Inc., Chicago, spoke on "The Modern Foundry—Design, Operation and Maintenance" Mar. 19 at a meeting of the Texas Chapter of the AFA at Texas State Hotel, Houston, Tex.

Mr. Ballard pointed out that any improvement program should be designed to increase capacity or decrease cost. Existing equipment should be fitted into the plan, with new equipment added to balance the capacity of each department. He went on to say that any modernization program should start out as trial arrangements on paper and should be planned with management and operating and maintenance personnel. Savings anticipated from the pro-

(*Continued on page* 238)

ANNOUNCING...

A RESEARCH AND ADVISORY SERVICE ON PROBLEMS RELATING TO

CORE BLOWER BOX DESIGN

***We invite you to send your core blowing problems to us . . . if our years' of experience don't provide the answer, we'd like to study the problem and find the answer!**

FOR INSTANCE

Through research and experience, we have found that core box maintenance has been reduced as much as 300% through the proper design and the application of our *Seal-Tite Ribbing*.

The Abrasive Resistance of Various Metals **has had our careful study so that we can tell exactly what to expect when a core box is put into production. The accompanying table shows the relative resistance to abrasion of fifteen materials which have been tried in core box construction.**

BLAST RESISTANCE TEST RESULTS

Material No.	Efficiency
1	145%
2	135%
3	100%
4	76%
5	70%
6	63%
7	50%
8	50%
9	44%
10	42%
11	41%
12	35%
13	32%
14	20%
15	10%

If you aren't getting the core box life you think you should or if you are planning new core box equipment, we invite you to ask for our Advisory Service. We will welcome the opportunity to give you the benefit of the specialized experience and research which we have devoted to these problems.

New BULLETIN on Core Blowing

*** Scheduled for publication in the near future is our new Bulletin "F" on Core Blowing which will contain considerable information of practical value. We invite you to write for a copy to be sent as soon as it is off the press.**

INDUSTRIAL PATTERN WORKS

PATTERNS FOR PRODUCTION—PATTERN ENGINEERING SERVICE

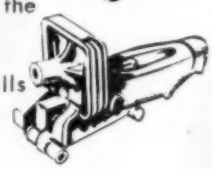
2600 BELMONT AVE. PHONE: IRVing—0413 CHICAGO 18, ILL.

BLUE CHIP* FOUNDRIES

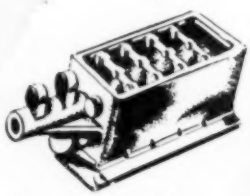
are changing "rejects" into "inspected and passed" right on their production lines

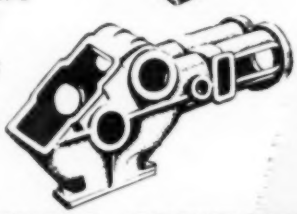
They use the *Tincher Process*, consisting of an integrally-built unit easily fitted into most any production line . . . providing pressure, heat and circulation for internal or external application of . . .

TINCHER FOUNDRY COMPOUND — the "sealing agent" in the *Tincher Process* . . . It's an effective metallic-chemical . . . fills voids and openings . . . rejects become sound, profitable production!



Some of the country's most important foundries have, over several years, provided the "proving ground" for the *Tincher Process*, now applicable to foundries of all sizes and most types of production.





TINCHER PRODUCTS COMPANY
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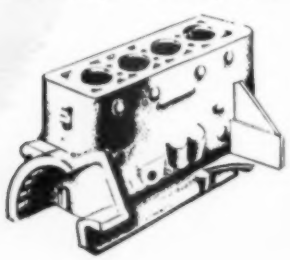


For "BLUE CHIP" names, stop at Booth No. 1224 at the AFA Foundry Congress and Show May 3-7 in Philadelphia, Pa. Learn how you, too, may end rejects, increase profits. Make yours a "Blue Chip Foundry."

(*Continued from page* 236)

gram should be balanced with the cost which should be written off in 3 to 5 years.

He discussed phases of foundry operation and maintenance after the improvement program has been completed.—*W. H. Lyne, Hughes Tool Co.*

Central Michigan

CENTRAL Michigan Chapter of AFA met at Schuler Hotel, Marshall, Mich., Mar. 23, to hear George Tubich, district engineer, Michigan State Health Department, Bureau of Industrial Health, speak on "Foundry Health Hazards."

Mr. Tubich said that foundry labor turnover is high and that foundry working conditions could stand further improvement. He maintained that management is responsible for such an improvement program and must sell the program to supervision, foundry workers and the public.

He added that improved working conditions are good business because they are a contributing factor to increased production. He also discussed good ventilation and displayed several pieces of equipment used in the measurement of dust and fumes in industry.—*C. C. Sigerfoos, Michigan State College*

Wisconsin

WISCONSIN Chapter of the AFA met at Hotel Schroeder, Milwaukee, Mar. 12, to hear Harry J. Jacobson, Industrial Pattern Works, Chicago, talk on "Corebox Design and Rigging for Core Blowing." Slides were used to illustrate the design and use of certain metals for corebox work. The talk was a preview of a longer one to be delivered at the foundry congress in Philadelphia.

Announcement was made of the Old Timers and Apprentices Dinner to be held in May.—*John E. Hubel.*

Pittsburgh

LABOR effort measurement, wage incentives and cost control devices as applied to small foundries were the major subjects of discussion at the Mar. 15 meeting of the Pittsburgh Foundrymen's Association, held at the Fort Pitt Hotel. Guest speaker of the evening was Dickie Dyer of Dyer Engineers Inc., Cleveland, who cited the following principles necessary to follow in achieving successful foundry wage incentives:

(*Continued on page* 240)

"See you at the FOUNDRY SHOW"

NATIONAL CARBON

ACHESON GRAPHITE

If you visit the Foundry Show at Convention Hall in Philadelphia, May 3-7, we cordially invite you to stop at the National Carbon booths 1231 and 1232 to chat—or just to relax.

We'll be looking for you. Stop in, won't you?

The "National" and "Acheson" seals distinguish products of

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York 17, N. Y.

Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

(*Continued from page* 238)

1. Employees effort should be measured over one day's time—each day should stand or fall on its own.

2. Pay him in full for everything he produces over your standard.

3. Protect him from factors which he cannot control.

4. Guarantee your measure to your employees.

5. Provide incentive awards for indirect workers.

6. Keep time and money separate.

Mr. Dyer went on to say that supervisors can be measured just as effectively with the budget as plant workers can be with time standards and their financial awards can be made just as attractive. Such a procedure would permit control over the company's total payroll dollars.

The thing that underlies control of payroll dollars can be extended to the control of all expenses—material purchases, sales expenses, overhead burden, etc. The measure of labor can be used as a common denominator on which to hang all expenses of doing business.

Castings can be priced individually rather than on a per pound basis, in the opinion of Mr. Dyer. Costs can be established and selling prices can be determined from them. Each pattern stands on its own.

Just as the standards for workers can be predetermined, so can total costs be predetermined, and management can decide intelligently whether to accept or reject business offered tnem.

Despite extensive efforts to make the foundry cleaner and a better place to work, the fact remains that young men still would rather go across the street to work in a machine shop for 10 cent less an hour. Mr. Dyer contended that with properly designed incentives, the foundry industry would be successful in attracting a greater portion of the young labor force.

The association's April 19 meeting was a round-table discussion conducted by the gray iron committee. A short talk on "Analysis of Casting Defects" by H. B. Reed of Westinghouse Air Brake Co., preceded the round table discussion. PFA's annual summer golf outing is scheduled for June 15 at the Edgewood Country Club.—*Joseph C. Sullivan.*

CENTRAL INDIANA: C. R. Simmons, representative, Durez Plastics & Chemicals Co. Inc., North Tonawanda, N. Y., (lower right), addressed Central Indiana Chapter of the AFA Mar. 1 at the Athenaeum, Indianapolis. Louis Stevens, foreman, C & G Foundry & Pattern Works, Indianapolis, (lower left) was technical chairman. A general view of the meeting is shown at top

Quad City

TOM E. Barlow, Eastern Clay Products Inc., Jackson, O., spoke before 125 members and guests of Quad City Chapter of the AFA Mar. 15 at Fort Armstrong Hotel, Rock Island, Ill. His subject was "Chemically Bonded Foundry Sands."—*C. R. Marthens, Marthens Co.*

Central Indiana

C. R. SIMMONS, Durez Plastics & Chemicals Co. Inc., North Tonawanda, N. Y., addressed 115 members and guests of Central Indiana Chapter of the AFA Mar. 1 at the Athenaeum, Indianapolis. His subject was "Plastic Pattern Making." Louis Stevens, C & G Foundry & Pattern Works, Indianapolis, presided as technical chairman.—*William K. Mitchell.*

Chicago

FOUNDRYMEN from the Chicago area attended a meeting of the Chicago Chapter of the Non-Ferrous Founders' Society at the Machinery Club, Chicago, Mar. 4. Leo A. Behrendt, president, Crucible Manufacturers' Association, and vice president, Joseph Dixon Crucible Co., Jersey City, N. J., talked on "The Care and Use of Crucibles in the Nonferrous Foundry."

After discussing the materials used in crucibles and methods of manufacture, Mr. Behrendt gave some notes on open flame furnaces versus crucible melting.

The formation of a cost clinic to be conducted by the chapter on a monthly or quarterly basis to educate employees on costs has the approval of the foundrymen of the area.

New England

RESULTS of a questionnaire covering factors of cupola operation were discussed by the New England Foundrymen's Association Mar. 10 at the Engineer's Club, Boston.

Walter M. Saunders was in charge of the meeting and explained the results obtained from the questionnaire which covered preparation of the cupola, lighting up, charging, tapping, mixtures and fluxes of cupolas from 24 to 72 in. ID.

The following members submitted questionnaires from which a summary of the replies was obtained: Thomas G. Healey, Seaboard Foundry Inc., Providence, R. I.; Albert Nutter, E. L. LeBaron Foundry Co., Brockton, Mass.; Robert C. Walker, Whitin Machine Works, Whitinsville, Mass.; Stanley Sowens, Riverview Foundry Co., Fall River, Mass.;

(*Continued on page* 242)

DUST CONTROL

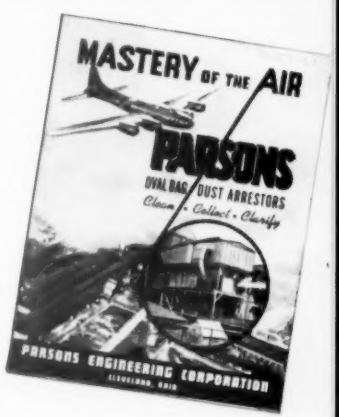
WITH ONE CENTRAL UNIT

Whether you are planning new construction or the alteration of present plant facilities, you should by all means consider over-all dust collection. The benefits derived from a central dust collecting system will help you meet present-day competition by assuring healthier and safer working conditions.

• **GREATER EMPLOYEE EFFICIENCY** • **LOWER MAINTENANCE COSTS**

• **INCREASED PLANT PRODUCTION** can be yours with a properly engineered dust collecting system to fit your requirements. Let Parsons' 28 years of experience help you eliminate dirt and dust . . . show you the profit possibilities that may have been overlooked through the reclaiming of particles formerly wasted in the air. Builders of the famous Parsons Oval Bag Dust Arrestor, we offer a complete service in designing and building modern dust collecting systems — from hoods to fan.

EACH of the above Oval Bag dust arrestors handl 40,000 cubic feet of air per minute, 24 hours per day aroun the clock — without shuttin down to shake the bags free c dust. This large, nationall known plant selected Parson again, based on past perform ance of previous installation.



Write for this
FREE *Bulletin*
"MASTERY OF THE AIR"

Let our Engineers Check Your Dust Problems

CREATIVE ENGINEERS MANUFACTURERS

Parsons **ENGINEERING CORP.**

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A MESSAGE TO CRUCIBLE FURNACE TENDERS

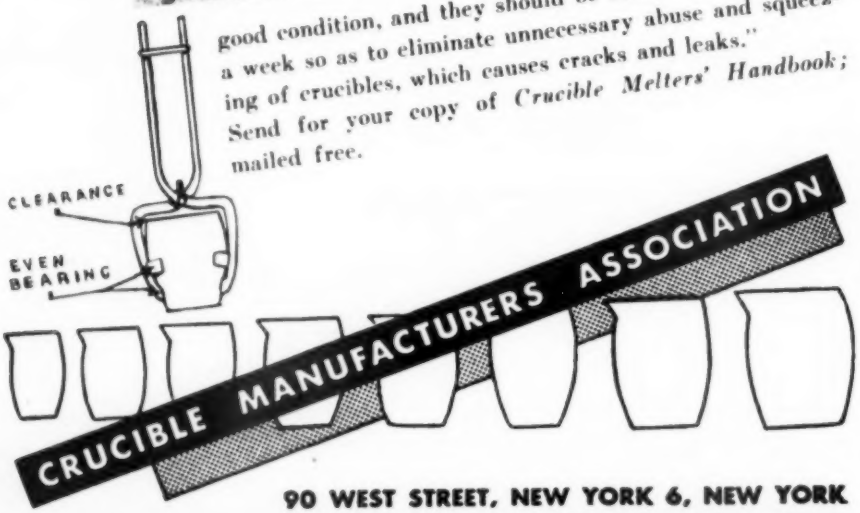
Special Self-Adjusting Basket-type Crucible Tongs (Patent pending) Photograph courtesy Hutchinson Foundry Products, Edwardsville, Ill.

Service from Crucibles can often be improved, and the life lengthened, by carefully fitted tongs and shanks.

Says *Crucible Melters' Handbook*: "Tongs should grip well below the bilge line and clear the top of the crucible to prevent crushing, cracking, or distorting of the crucible. Ill-fitting tongs are extremely detrimental and the cause of a large percentage of crucible failures. Many crucibles have been ruined through poor fitting hardware.

Tongs and shanks not only should fit properly to start with, but care should be taken to keep them in good condition, and they should be refitted at least once a week so as to eliminate unnecessary abuse and squeezing of crucibles, which causes cracks and leaks."

Send for your copy of *Crucible Melters' Handbook*; mailed free.



90 WEST STREET, NEW YORK 6, NEW YORK

(*Continued from page* 240)

Robert Wentrup, Grinell Corp., Auburn, R. I.; Jack Bryniarski, Independent Lock Co., Fitchburg, Mass., and William Ohlson, Draper Corp., Hopedale, Mass.—*Merton A. Hosmer, Hunt-Spiller Mfg. Corp.*

Tennessee

THE first meeting of the new Tennessee Chapter of the AFA was held March 26 at the Patten Hotel, Chattanooga. Norman Dunbeck, Eastern Clay Products Inc., the guest speaker, gave an interesting talk on "Synthetic Sand Practice" after which a lively discussion pertaining to individual sand problems was conducted.

One hundred foundrymen were in attendance for the dinner and talk.

Mr. Dunbeck opened his address by stressing the fact that in a new organization such as the Tennessee Chapter, attendance was the outstanding factor contributing to the success of such a group.

In the course of his talk, Mr. Dunbeck elaborated on four fundamental questions, as follows: 1. What is synthetic sand? 2. How is it compounded? 3. Who should use it? 4. How does a foundry make it pay?—*A. D. Willis, U. S. Pipe & Foundry Co.*

Massachusetts Institute

STUDENT chapter of the AFA at the Massachusetts Institute of Technology was installed Mar. 2 by AFA President Max Kuniansky and William W. Maloney, secretary-treasurer.

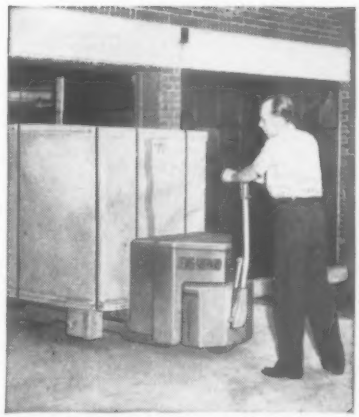
After an informal supper the meeting was opened by Mr. Maloney who gave the evening's program and introduced Chapter Chairman Gerald Grott as master of ceremonies.

Prof. John Chipman, head of the Department of Metallurgy, outlined the development of the foundry program at M. I. T. Professor Erwin H. Schell, head of the Department of Business and Engineering Administration, spoke of the alloying of engineering science and business knowledge to produce engineers best fitted to function in our competitive industry.

Rufus F. Harrington, Hunt Spiller Corp., Penton Gold Medalist and industrial advisor to the chapter, welcomed the student members to the ranks of the foundrymen and stated his willingness and desire to co-operate closely with the chapter on all matters where he could be of assistance. He then introduced Merton

(*Concluded on page* 245)

LEWIS-SHEPARD FORK TRUCK



LEWIS-SHEPARD POWER JACKLIFT

Battery Electric Trucks and EXIDE-IRONCLAD BATTERIES

Speed production . . . cut material handling costs

There are no material handling problems . . . and no bottlenecks . . . where time-saving, cost-cutting Battery Electric Trucks are on the job. Freight cars and trucks are more quickly loaded and unloaded. Goods in process move quietly and smoothly through the plant. Finished products are hauled safely to warehouse and tiered ceiling high.

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MODERN ROLL-OVER MACHINES

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IMPROVED UP-TO-THE-MINUTE MOLDING MACHINES FOR EVERY NEED

(*Concluded from page* 242)

Hosmer, chief metallurgist, Hunt Spiller Corp., and past president of the New England Foundrymen's Association, who welcomed the chapter on behalf of the New England group, and Walter Clark, D. W. Clark & Co., who extended the best wishes of the New England members of the Non-Ferrous Founders' Society and invited student members to attend the nonferrous meetings.

Secretary-treasurer William Maloney then presented the traditional cast iron rattle to Chapter Chairman Grott.

Principal speaker was Max Kuniansky, who cited the benefits which the foundry industry enjoys through co-operative efforts in the association. In discussing the present and future activities of the society, he stressed the urgent need for well-trained engineers for advancing foundry technology.

Vice-Chairman Leonard W. McKibben announced the next meeting of the Student Chapter at which Charles W. Briggs will lecture on the "Design of Steel Castings".

Faculty advisor Prof. H. F. Taylor, Penton Gold Medalist, then conducted an informal tour of the foundry facilities and cited the present expansion and future plans for expansion of the institute's foundry program.

Officers of the student chapter are: Chairman, Gerald J. Grott; vice chairman, Leonard N. McKibben; secretary-treasurer, Martin J. O'Brien, III; technical secretary, L. M. Diran; faculty advisor, Prof. H. F. Taylor; industrial advisor, R. F. Harrington.—*L. M. Diran.*

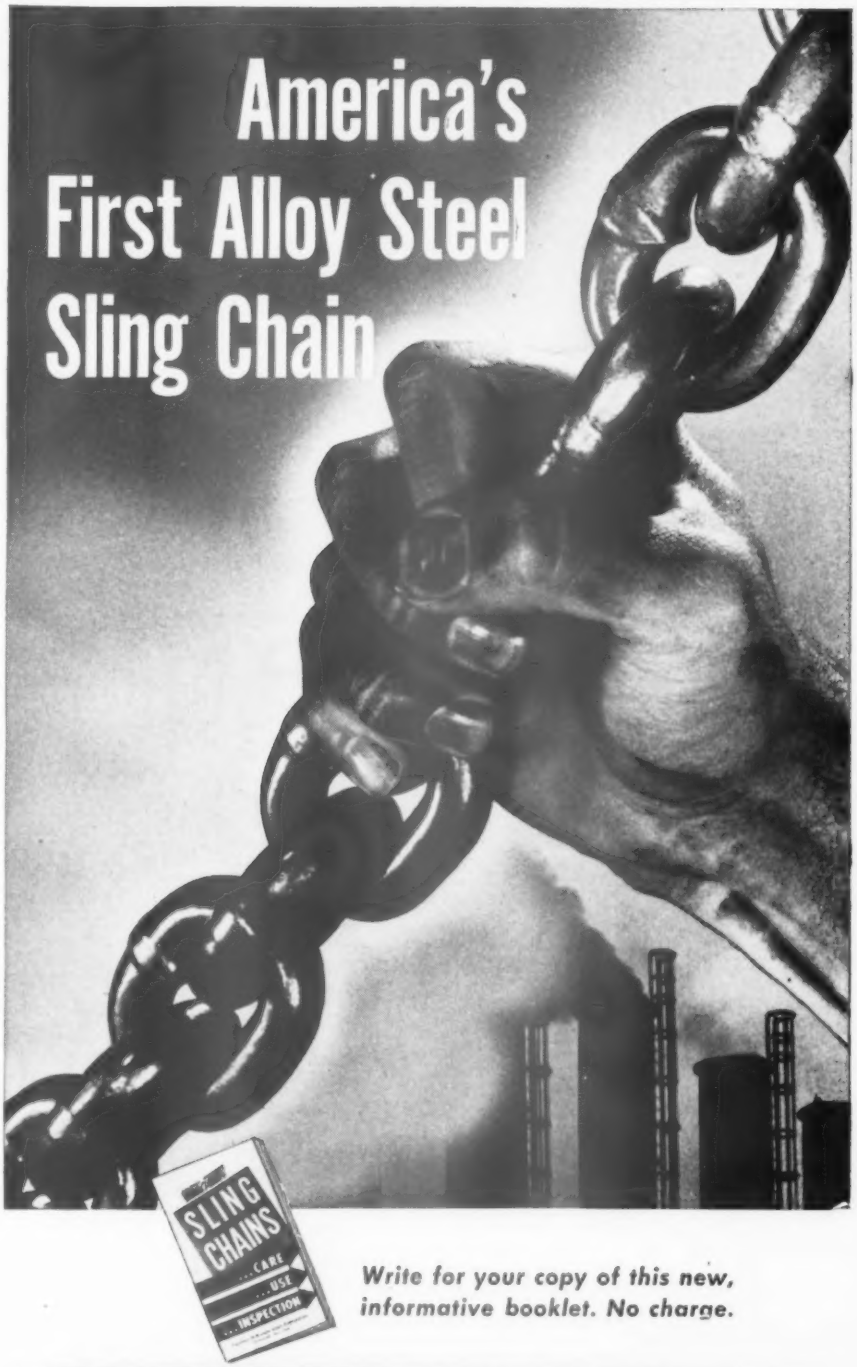
Rochester

ROCHESTER Chapter of the AFA held National Officers' Night Mar. 9 at Seneca Hotel, Rochester, N. Y. National AFA Vice President William B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, spoke briefly on activities of the association.

Ray Quadt, chief of the aluminum section, American Smelting & Refin- Co., New York, was technical speaker. His subject was "Certain Aluminum Foundry Problems, Their Causes and Elimination." Mr. Quadt discussed melting and pouring problems and such factors as mold design, gates, risers and chills. He spoke in detail on the proper preheat of the metal, fluxes and sources of gas.

The program was concluded with the showing of Pangborn Corp.'s film entitled "Cylinder Block Cleaning at Ford Motor Co."—*G. M. Etherington, Gleason Works Inc.*

CM HERC-ALLOY



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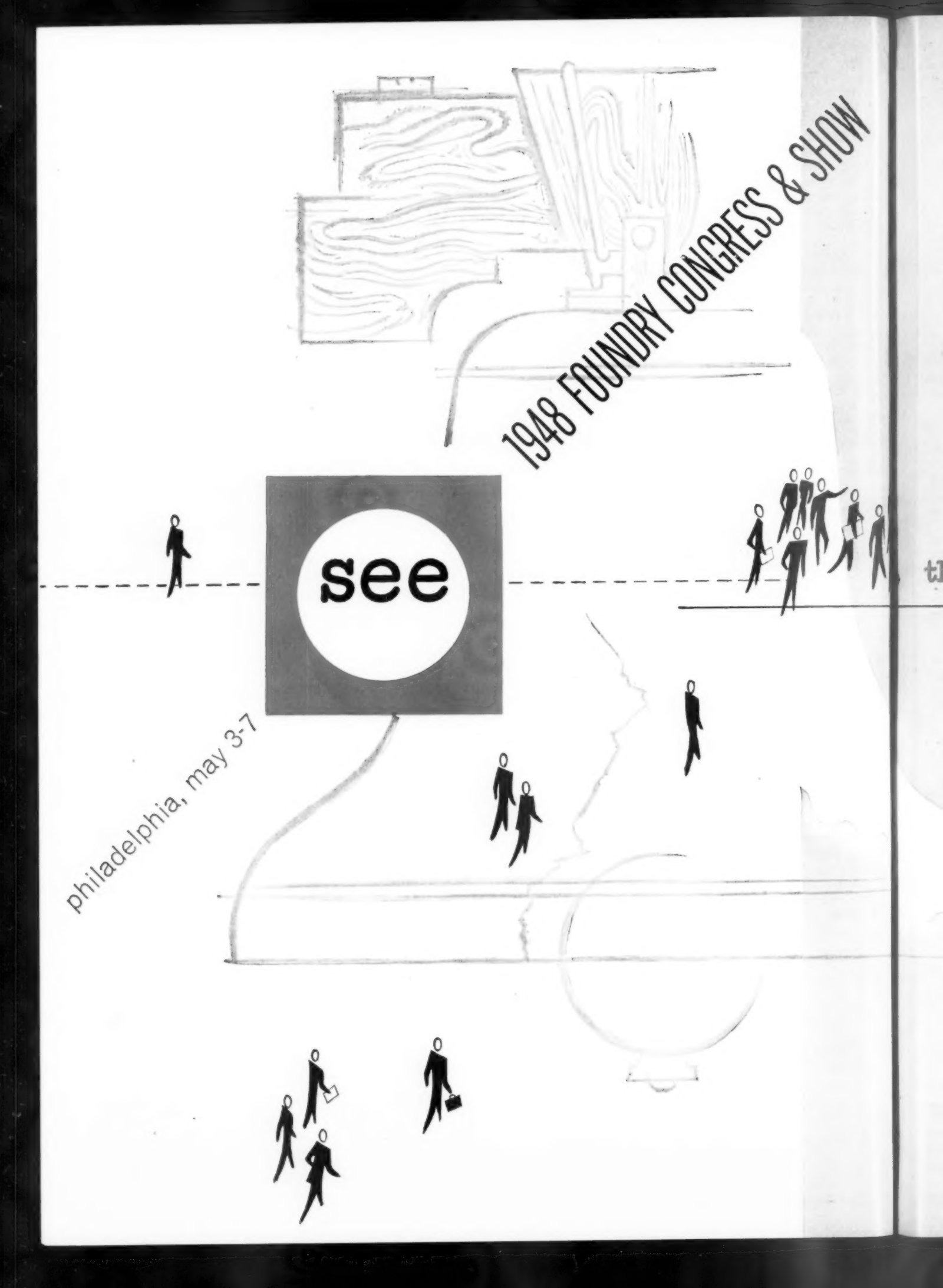
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sand

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- UP TO 50% LESS CLEANING COSTS
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Four Schools Form AFA Chapters

Directors of the American Foundrymen's Association have approved the formation of student chapters at the University of Minnesota, the school of mines and metallurgy of the University of Missouri, and Massachusetts Institute of Technology, in addition to Ohio State University. Formation of the Ohio State Chapter was reported here last month.

The University of Minnesota group was organized as AFA's first student chapter in 1941. It was suspended during the war emergency, and is now re-admitted under a new student chapter policy adopted by the AFA Board last year.

The reorganized chapter has named John Hermanson chairman, Lyde M. Irwin vice chairman; Harvey S. Sauby, secretary and Ted Swanson treasurer. James H. Anderson, instructor in mechanical engineering at the university, has been named faculty advisor and Carter DeLaittre, coreroom foreman for Minneapolis Elec-

Foundry Handles Sand Pneumatically

The modern foundry of the Philadelphia Naval Shipyard incorporates a number of specially designed materials handling installations. One of the interesting devices employed is a pneumatic process for unloading sand from railroad cars and also for transferring sand from storage bins to service hoppers.

Equipment employed is a portable unit developed by the Dracco Corp., Cleveland, capable of handling 8 to 9 tons of sand per hour over a total distance of 75 ft, including suction and discharge. A flexible hose attached to the unit leads to the gondola car from which the sand is drawn by suction into the receiver of the conveyor and then is blown through another hose leading to 1500-ton capacity storage bins. The same equipment also is used to transfer sand from the storage bins to 6-ton capacity sand blast hoppers.

The conveyor unit, mounted on wheels for portability, is approximately 18 ft long, 6 ft wide and 18 ft high. A 40-hp electric motor drives the vacuum pump. The receiving station is equipped with a filter to remove dust from the conveying air.

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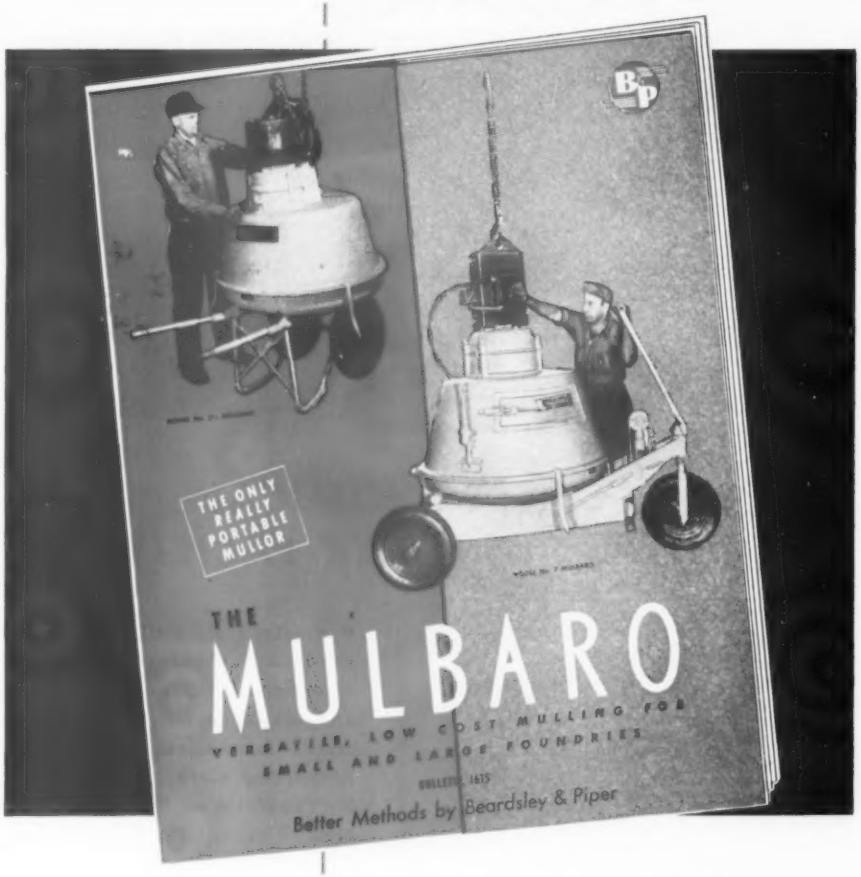
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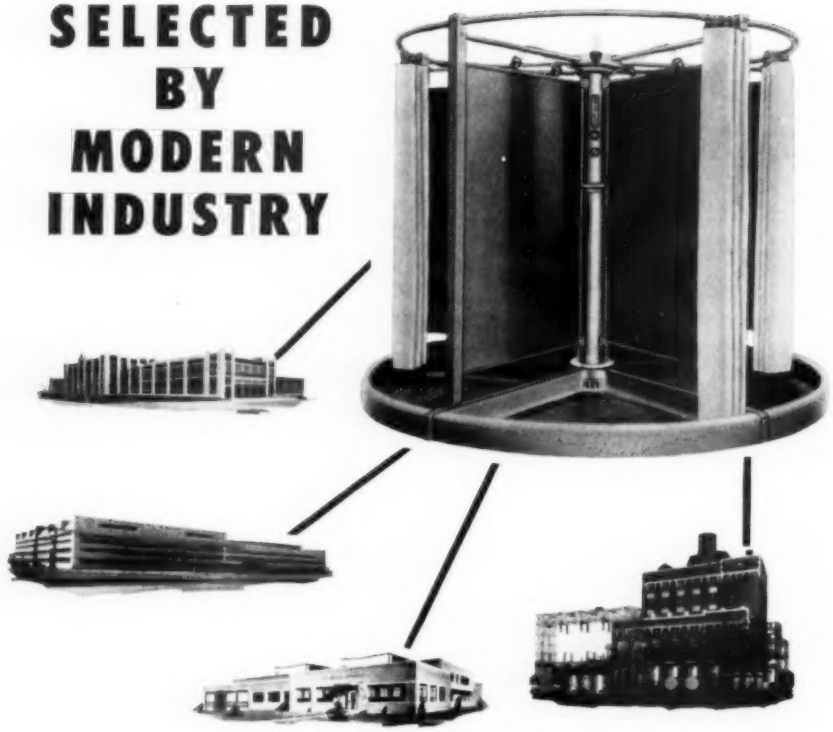

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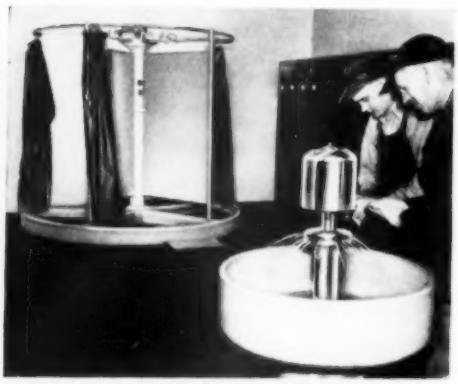

Showing one of the Bradley Multi-Stall Shower installations at the Ray-O-Vac Co., Plant . . . . in foreground, a Bradley Washfountain.

• Bradley Multi-Stall Showers meet with an enthusiastic reception wherever installed—by employee and management alike. Among recent installations are included: Armstrong Cork, Pittsburgh,—7; Borg-Warner, Memphis,—5; New River & Pocahontas Mine, Havaco, W. Va.,—11; Electrolux, Old Greenwich, Conn.,—2; Scovill Mfg. Co., Waterbury, Conn.,—5; C & O R.R., Newport News, Va.,—6; Northern States Power Co.,—1; Philadelphia Electric Co.,—1; Carolina Power & Light,—2.

These convenient, partially assembled 5- and 3-Stall Shower Units can be quickly installed in either new or old buildings on any kind of floor including wood. One Bradley 5-Stall requires only three supply lines—hot, cold, and drain, in comparison to 15 plumbing connections needed for five conventional "single-stall" showers.

This simplified installation plus complete absence of dirt collecting corners and dark areas cuts cost of maintenance and janitor detail. Further savings are realized in reduced hot water expense and total water consumption. Like Bradley Washfountains, Multi-Stall Showers are considered the standard of economy, sanitation, and utility. BRADLEY WASHFOUNTAIN CO., 2217 W. Michigan Street, Milwaukee 1, Wis.

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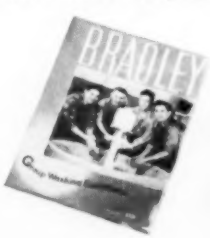

BRADLEY multi-stall showers

tric Steel Castings Co., industrial advisor.

To assist in the planning of technical programs and other activities and in bringing outstanding foundry technologists to the meetings as featured speakers, faculty and industrial advisors have been named for each student group.

Dr. David S. Eppelsheimer is faculty representative with the University of Missouri Chapter; George E. Mellow, partner in Liberty Foundry Co., St. Louis, industrial counselor. James E. Reynolds, Jr., is chairman; Gordon H. Moline, vice chairman; John G. Reilly, secretary, and Stanley Zirinsky, treasurer.

Prof. Howard F. Taylor represents the faculty with the Massachusetts Institute of Technology student unit. Industrial advisor is R. F. Harrington, foundry superintendent of Hunt-Spiller Mfg. Co., Boston, a past international director of AFA and the 1943 recipient of its John A. Penton Gold Medal.

Gerald J. Grott is president; Leonard H. McKibben, vice president; Martin J. O'Brien III, secretary-treasurer, and Loris M. Diran, technical secretary.

Book Review

Federal Labor Laws, The; fabricoid; 72 pages; published by National Foremen's Institute Inc., Deep River, Conn. Price $2.50.

Prepared in ring binder form to facilitate inclusion of later material, this book is intended as a manual for supervisors in dealing with labor problems affecting companies and their employees. With the landslide of federal labor legislation during the last decade, foremen have been faced constantly with questions relating to employees' rights.

This manual, designed to give the needed help, presents information about federal labor laws which every foreman should know. The following subjects are covered: National Labor Relations Act (Wagner Act); Fair Labor Standards Act (Wage and Hour Law); Walsh-Healey Public Contracts Act; Wage Stabilization; Social Security Act; United States Employment Service; Fair Employment Practices Committee; and Veteran's Rights.

National Foremen's Institute Inc. also has published a 55-page, 5¼ x 8 in., paper bound manual entitled *What You Should Know About The Wage and Hour Act* and compiled and edited by Arthur T. Jacobs. Price 75 cents. This is a manual of questions and answers for employers, executives and employees in practically all industrial fields.

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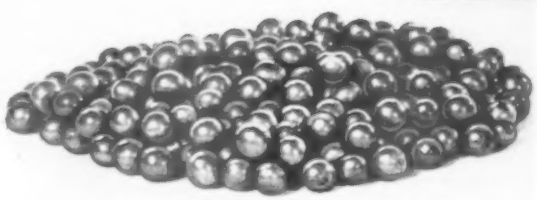
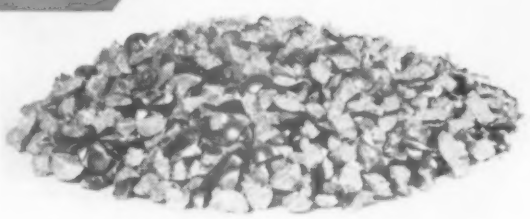
by *Metal Blast*

The Tougher Shot and Grit

It's the longer life that counts and it's not brittle, either





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ANNEALSHOT IS JUST PLAIN TOUGH—Its 15% longer life and gentleness to cleaning and peening equipment identifies it from others—and it costs no more than ordinary shot. Order a trial lot today and see for yourself. Or, let us furnish a free sample for your own laboratory test. Write us today. **SHOT OR GRIT, A SIZE FOR EVERY PURPOSE.**

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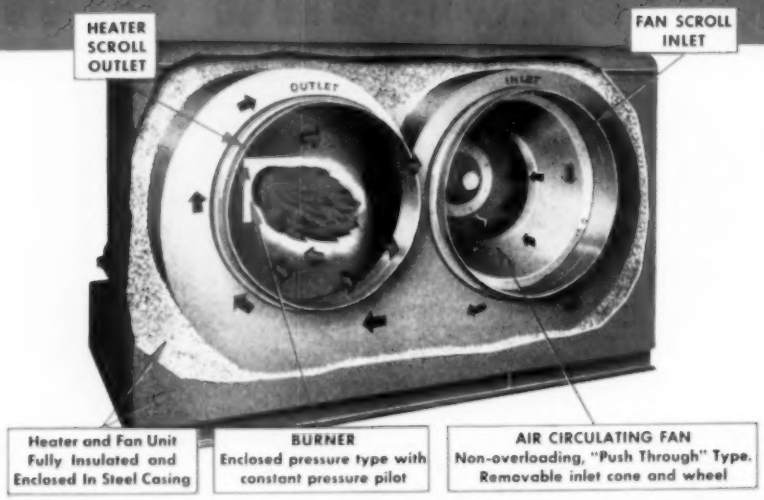
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The Scroll-Aire Oven Heater will burn gas and oil fuel or either one individually as conditions require. The Scroll-Aire is a direct-fired heater which provides greater combustion efficiency. Combining the re-circulating fan, burner, insulated heater casing, combustion air blower, motors, drive and safety controls all on one platform, compact design makes the Scroll-Aire ideal for new oven installations or to "rejuvenate" old ovens.

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British Institute Holds Meeting

Annual general meeting of the Institute of Metals (Great Britain) was held in London on Mar. 16 to 18 at which announcement was made of the offer of Capper Pass & Son Ltd. of an annual sum of £200 for a period of seven years to be available to the institute and the Institution of Mining and Metallurgy for awards for encouragement of papers on extraction metallurgy, and processes and plant in the nonferrous industries.

Report of the council confirmed that administration of the Iron and Steel Institute and the Institute of Metals no longer was practicable under a joint secretary, and Lieut. Col. S. C. Guillian had been appointed secretary of the institute as well as editor of its publications. Membership showed an increase over previous years and now is 3215.

The following were elected to be fellows of the institute in recognition of eminent services to the institute: Cecil H. Desch, Whitehead Iron & Steel Co. Ltd., and Lt. Col. Sir Henry M. Greenly, British Nonferrous Metals Research Association. In recognition of their distinguished services to science or practice of nonferrous metallurgy, honorary memberships were granted to Prof. Pierre A. J. Chevenard, Ecole des Mines, Paris; Prof. Sir Goeffrey I. Taylor, and John F. Thompson, International Nickel Co. of Canada Ltd.

Officers elected for the ensuing year included: President, Sir Arthur Smout, Imperial Chemical Industries Ltd., and vice presidents, Dr. S. F. Dorey, Lloyd's Register of Shipping; A. J. Murphy, J. Stone & Co. Ltd., and H. S. Tasker.

Papers presented at the meeting included:

"Calculation of Loads Involved in Metal Strip Rolling", by Dr. M. Cook and Eustace C. Lake, both of Imperial Chemical Industries, Ltd. "Hot Shortness of Some High Purity Alloys in the Systems Aluminum-Copper-Silicon and Aluminum-Magnesium-Silicon", by Dr. P. H. Jennings, English Electric Company, Ltd., Dr. A. R. E. Singer, University of Birmingham, and W. I. Pumphrey, University of Birmingham. "A Consideration of the Constitution of Aluminum-Iron-Silicon Alloys and its Relation to Cracking above the Solidus", by Dr. P. H. Jennings and W. I. Pumphrey. "Striations: Metallographic Evidence of Slip", by D. McLean, National Physical Laboratory, Teddington.

"The Effects of Single and Multi-hole Die Extrusion on the Properties of Extruded Aluminum Alloy Bar", by Dr. L. Northcott, Armament Research dept., Woolwich; D. McLean, and Dr. O. R. J. Lee. "The Young's Modulus of Some Aluminum Alloys", by N. Dudzinski, Royal Aircraft Establishment, Miss J. R. Murray and B. W. Mott, Atomic Energy Research Establishment, and Dr. B. Chalmers, Atomic Energy Research Establishment. "Pressure and Creep Tests at Constant Hoop Stress on

(*Concluded on page* 254)

FOUNDRY ENGINEERS

Are Worthy of Their Hire...

when you are operating at high pressure and need to improve, expand, or modernize your plant without reducing production, or plan and build a new plant and cannot risk the distraction of such a venture with its demands on your time and the constant attention to countless details,

or if you desire to plan a program of development over a period of several years in successive stages, where each step must be properly planned for ultimate success,

because the full time job of management of complex foundry operations should not be burdened with the highly involved nature of foundry engineering.

We have initiated some of the newest designs and techniques in foundry equipment, economical in money outlay and use of space, obtaining minimum costs by fitting the most efficient handling means into the production line and incorporating maximum safety to operating personnel.

Whether it be exactitude in sand conditioning, improvements in core making, furnace room practices, innovations in molding, cleaning, finishing, closer inspection control, less inventory in process, or a better product, to name a few things at random, a ready service is available for all phases of foundry betterment.

We have the solutions of problems ordinarily quite difficult for your operating staff. The confusion attending the negotiating for equipment, both as to means and suitability is eliminated by our complete design and construction plans and specifications. These procedures detect every economic short cut toward the lowest ton cost at the shipping door.

Our more than twenty years of engineering background in the industry have given us the "Know-how" to successfully complete any mission.

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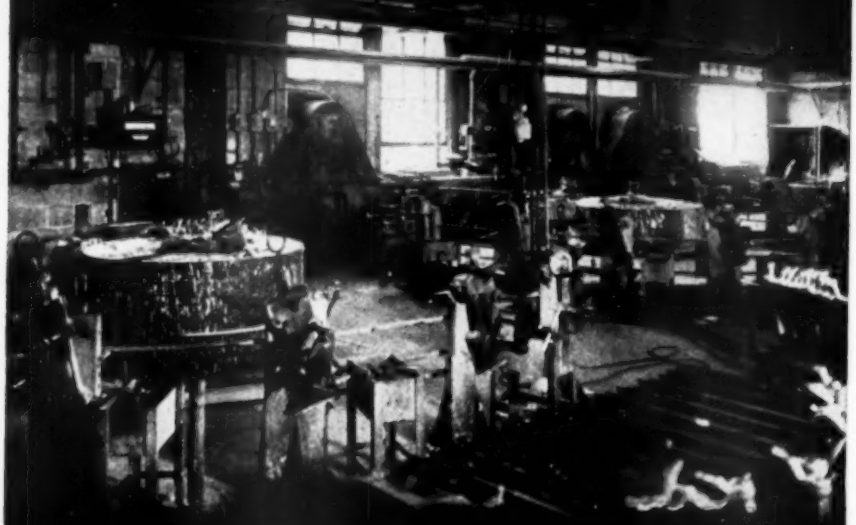

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300-320 MOORE ST. HARRISON, OHIO

(*Concluded from page* 252)

Lead and Alloy 'E' Pipes", by Dr. A. Latin, British Insulated Callender's Cables, Ltd., London, and "Recent Developments in Corrosion-Resistant Aluminum-Magnesium Alloys", by Dr. Ing. P. Brenner, Royal Aircraft Establishment, and Dr. Ing. W. Roth, High Duty Alloys, Ltd., Worcester.

Student Inspection

Two classes of boys studying foundry practice at Crane Technical High School, Chicago, were taken by their instructor, George A. Davis, on a visit Mar. 15 to the foundry of the Hurley Machine Division, Thor Corp., Chicago, to observe the technique in use of chemically-coated sand. James Wilkins, foundry superintendent, was host and guide to the two groups of 30 students each.

E. Towlowski, assistant foundry superintendent, gave a brief talk on testing of sand in the laboratory and explained the methods of control. The visitation was arranged by Eugene W. Smith, sales representative, Western Materials Co., Chicago, who accompanied the two classes on their inspections.

Book Review

Analysis of Casting Defects; cloth; 133 pages 6 x 9 in., 101 illustrations; published by American Foundrymen's Association, 222 West Adams Street, Chicago; $1.85 to members; $2.75 to nonmembers.

Compilation and assembling of the material, a major project of an AFA committee, is a detailed study on the cause and correction of casting defects. A comprehensive outline of the causes of gray iron casting defects lists 31 attributable to ten specific and one general phase of foundry operation. This outline can be used advantageously to get an overall picture of the probable cause of any defect. Originally intended primarily for gray iron foundrymen and prepared by men primarily associated with the gray iron field, the book is valuable to all foundrymen.

Thirty-one basic casting defects are listed, illustrated and described. Each defect is defined in terms, simple yet sufficiently complete to make the defect recognizable. Object of the committee was to find the basic defects and outline the fundamental causes.

If one might venture a mild criticism it is on the inclusion of a few references and illustrations of casting defects so glaring and elementary they may be recognized by even an embryo foundryman at first glance. For example, a casting from which one or more cores have been omit-

(*Concluded on page* 258)

"take it" from Chief Keokuk...

60 30 12½

that's KEOKUK Electro-Silvery

Keokuk Electro-Silvery . . . 60 pound, 30 pound and 12½ pound . . . all are uniform in size and weight and all contain extremely accurate percentages of silicon, iron and alloys. Distinctively modern pigging machines, developed by Keokuk, provide this accuracy. Keokuk's special manufacturing process permits frequent metallurgical tests assuring thorough and constant control.

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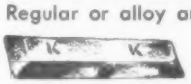
60-pound Keokuk Electro-Silvery Pigs for blocking the open hearth heat. For equal distribution of silicon and best temperature melt-down. Handle by magnet.

FOUNDRIES

30-pound Keokuk Electro-Silvery Pigs for charging mechanically or by hand into the cupola. Easily broken into two or more pieces, handled by magnet and measured by weight. Regular or alloy analysis.



12½-pound Keokuk Electro-Silvery Piglets so uniform in weight that they may be charged into the cupola by count, eliminating weighing operations. Handle by magnet. Regular or alloy analysis.

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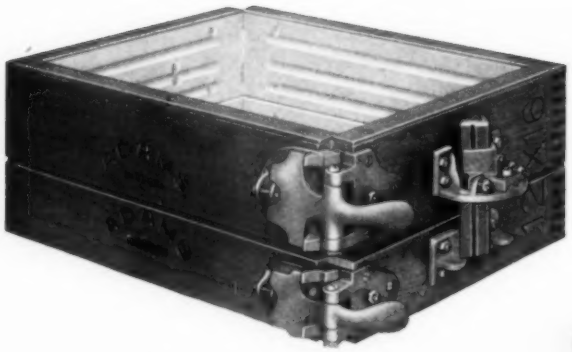

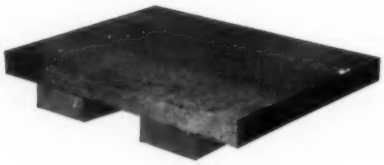

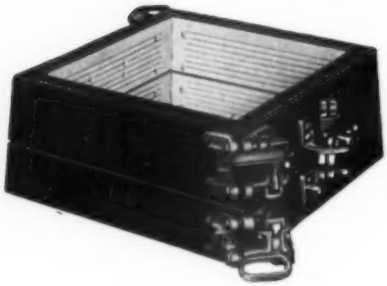

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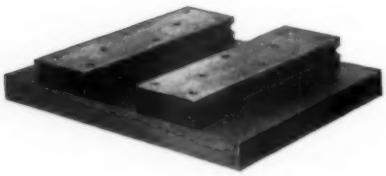

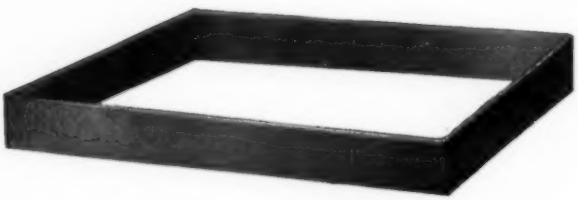

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DUBUQUE,

MOLDING MACHINES . . . . . FLASK

SUPERIOR PERFORMANCE
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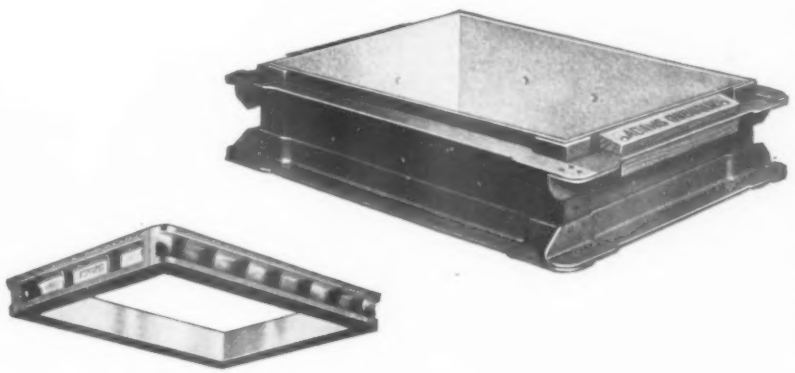
Flask Equipment

Accepted as quality standard over 45 years ago, Adams Flask Equipment continues to lead the field. Dependable, *proven* performance maintains peak production of high quality castings, reduces rejects and lowers production costs. Adams durable, accurate Flask Equipment is individually engineered by experts for your particular requirements. Write for descriptive literature, or send your specifications for a prompt estimate of costs. THE ADAMS COMPANY, 800 Foster St., Dubuque, Iowa.



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Cherry Snap Flasks
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For the highest quality in foundry equipment specify "Adams"

COMPANY
IOWA, U.S.A.

EQUIPMENT . . . . . Established 1883

THERE MUST BE
A REASON WHY...

DURA-STIX
FIREBRICK CEMENT

has maintained an enviable reputation for faithful service in the foundry for over twenty five years

KEYSTONE REFRACTORIES COMPANY

120 Liberty St. New York 6, N. Y.

(*Concluded from page* 254)

ted. However, this is more than offset by the extensive treatment accorded other forms of defects. Gas holes, porosity, pin holes, blisters, causes and remedies occupy 18 pages. Other common, at times mysterious and occasional controversial subjects, include: Scars, seams and plates; shot iron or cold shot; shrinkage cavities; hot tears and cracks; mass hardness; hard spots; warped castings; open grain; missruns; foreign inclusions; cuts and washes; erosion scabs; expansion scabs, buckles, rat tails, blacking scabs and pull downs; crushes, pushups and clampoffs; drops; stickers; rough surface; metal penetration; fusion; swells, fins, strains and sags; shifts; core raise; ramoff; cores, wrong, omission and improperly set; runouts and bleeders; broken castings; inverse chill; poured short; kish; defective test specimen. Value of the book is increased by an unusually complete 15-page index.

Book Review

SAE Handbook 1947, *cloth*, 822 *pages* 5½ x 8 inches, published by Society of Automotive Engineers Inc., New York 18. Price $10.

Through use of lighter paper this new edition of SAE standards is reported to be one-third thinner and one half pound lighter, yet presents 10 per cent more text. New material includes specifications for hydraulic brake fluids, standards for serrated shafts, nomenclature and definitions for three types of crankcase oil, standards for pipe, filler and lubrication fittings, specifications for automotive steel castings, and general information on welding electrodes and on copper and silver brazing. Other standards and specifications previously presented have been reviewed and revised to bring them up-to-date.

Of specific interest to foundrymen are the sections devoted to standards for ferrous and nonferrous castings including those of malleable iron, gray and alloy cast iron, steel, aluminum alloy, copper-base, and magnesium alloy. In those data are given on nominal compositions and minimum physical properties with information on applications. Where comparable standards of other organizations exist, they are indicated.

The society also has made available separate pamphlets containing material presented in the handbook to facilitate its use. One is SP-30, *SAE Iron & Steel Standards and*

(*Concluded on page* 260)

HOW TO STOP LOSING DOLLARS

when making and baking cores

IN THE MIX . . .

By replacing part of the core oil with less expensive Hercules Truline Binder, you get quicker and more thorough core oil oxidation and a mix that costs less.*

IN THE OVEN . . .

Truline-bonded cores bake up to 25% faster than all-oil-bonded cores, save valuable time. They bake uniformly, often eliminate one extra trip through tower ovens.

IN STORAGE . . .

The moisture resistance of Hercules Truline Binder keeps cores stronger over longer storage periods.

IN POURING . . .

Truline-bonded cores give you a greater margin of safety at pouring time. *Truline* reduces the possibility of gas holes, scabs and blows, caused by unoxidized core oil.

IN SHAKE-OUT . . .

Truline-bonded cores, as opposed to pitch-bonded cores, burn out quickly, shake out faster, save up to 50% of valuable cleaning time. This saving alone makes Truline worth while.

HERCULES

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REG. U.S. PAT. OFF.
BINDER

HERCULES POWDER COMPANY
920 King St., Wilmington 99, Del.

* The new leaflet, "Take a Tip from Me," gives specific recommendations. Write to HPB-2

HOW LONG DOES IT TAKE YOUR SAND TO RUN OUT?

You help yourself and you help your supplier when you plan and place your orders on sands well in advance of needs. Possibilities of being caught short by transportation snags and other unforeseen events are thus eliminated. It should be entirely unnecessary for you to gamble with the chance of being confronted with empty bins. Insist on a routine of anticipating needs well ahead . . . MAKE YOUR KNOWLEDGE OF SCHEDULED SAND USAGE SERVE AS A VALUABLE FORM OF INSURANCE.

BE SURE OF YOUR SOURCE

Industrial Silica enjoys a long-standing reputation for faithfulness to desired quality and grade on every shipment. Definite delivery advantages are also available from the four Industrial Silica plants in the heart of the foundry industry. Here are some of the sands regularly furnished: sands graded to meet your specifications for heavy, medium and light steel castings; natrual, unwashed sands for heavy steel castings; runners, ladle lining and general blast furnace use; for all types of gray irons and malleable, steel and aluminum cores; for acid furnace bottoms and for all types of blasting.

We anticipate a heavy demand for sands to be used in the making of magnesium and aluminum castings. Therefore, we solicit your inquiries as soon as possible.

THESE WELL KNOWN NAMES
• PORTAGE • GEAUGA • COXEY • VENANGO
ARE INDUSTRIAL SILICA SANDS

INDUSTRIAL SILICA CORPORATION
STAMBAUGH BUILDING
Youngstown, Ohio

Attention: Meet our representatives at the Bellevue-Stratford during the convention.

FOUR PLANTS . PHALANX, OHIO • GEAUGA LAKE, OHIO
DUNDEE, OHIO • UTICA, PA.

(*Concluded from page* 258)

Specifications containing data on alloy steels, steel castings, malleable iron, gray iron, hardenability tests, hardness numbers, etc., available for $3. Another is SP-31, *SAE Nonferrous Standards and Specifications* covering cast and wrought aluminum and magnesium alloys, solders, bearings and bushing alloys, copper-base alloys, zinc die castings, powder metal bearings, etc., available for $2.50.

Book Review

The Fracture of Metals, by Maxwell Gensamer, Edward Saibel, John T. Ransom and Robert E. Lowrie, paper, 58 pages, 6 x 9 in., published by American Welding Society, 33 West 39th St., New York 18. Price $1.

This book is, with a few minor modifications, a report submitted to the Bureau of Ships of the U. S. Navy and is intended to provide means for engineers and designers to approach intelligently the problem of fracture. It is a summary of reviews of the literature and direct interviews with outstanding men in the field and represents a compilation of the present knowledge of the laws and fundamental mechanism of fracture.

The book is divided into two parts. Part I includes the original survey of the literature and an analysis of the theories of fracture and applications of principles. Part II uses the framework established in Part I to clarify new developments in the theories of fracture and plastic flow.

Public Relations

"How To Tell Your Company's Story," is the title of a booklet recently published by the Research Institute of America Inc., 292 Madison Ave., New York 17. It analyzes techniques and approaches which have been developed by companies in successful public relations programs. The analysis outlines methods, tested by some of the largest firms in the country, for telling the company's story to employees, stockholders and the public.

Book Review

Precision Investment Castings, by Edwin Laird Cady, cloth, 356 pages, 6 x 9 in., published by Reinhold Publishing Corp., 330 West 42nd St., New York 18. Price $6.

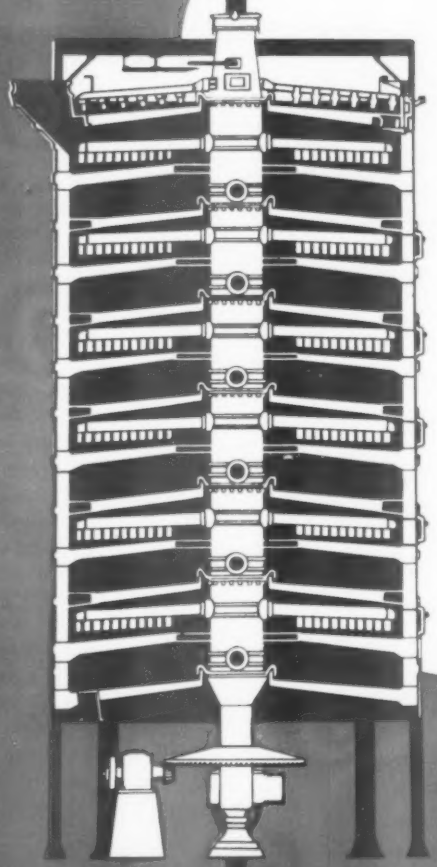
Objective of the author of this book is to shorten the "misunderstood" stage for precision investment casting so that the process can begin to

(*Concluded on page* 262)

Nerco

sand reclaiming units

HOW MUCH IS YOUR USED SAND WORTH?



Foundries which discard used sand—consider it without worth. Foundries which reclaim their used sand, i.e. remove the undesirable fines, clay and organic matter, get a sand that not only looks new but works like new sand.

Which is better business—buy new sand, use it once, then discard it—or reclaim the used sand and use it over and over again?

NICHOLS sand reclaiming units accomplish this cleaning operation with a minimum of labor and maintenance costs. A choice of methods insures each installation the utmost in economy and quality of product.

Our experience as equipment suppliers to the metallurgical industries for many years, and our complete engineering services assure efficient, practical design and proved equipment.

Write for a survey of your requirements, without obligation. A NICHOLS engineer will be glad to call and make recommendations for the most suitable system for you. A letter will do it.

NICHOLS ENGINEERING & RESEARCH
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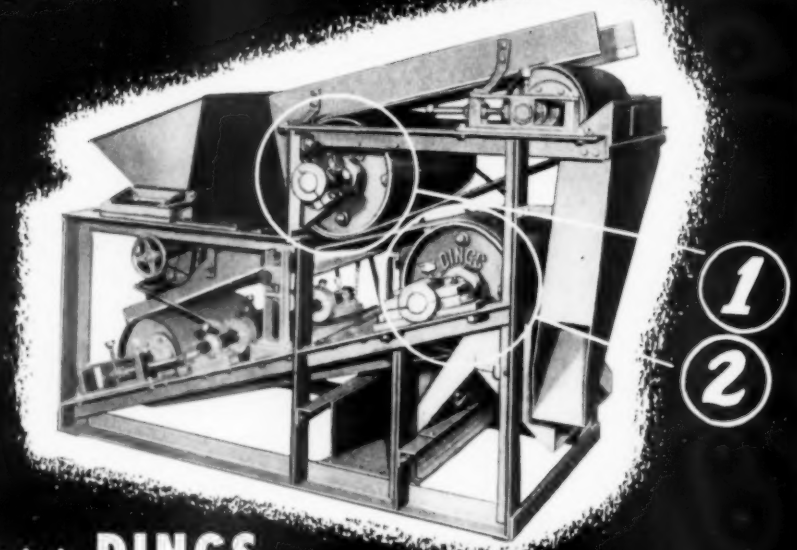
In Canada: University Tower Bldg. Montreal

You are cordially invited to visit our Booth No. 607 1948 Foundry Congress

NEW! Double Action SCRAP SEPARATOR

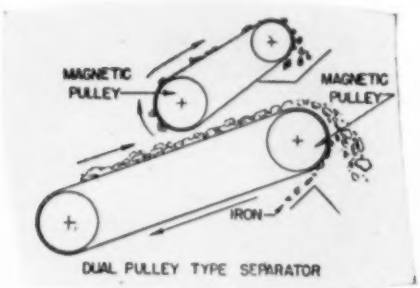


with DINGS ALNICO MAGNET PERMA-PULLEYS!

Makes Scrap Separation as easy as ONE-TWO!

- New
- Permanent ... non-electric
- Most powerful permanent pulleys available
- Highest quality Alnico
- No wiring
- No electrical maintenance
- No operating cost
- Full magnetic power guaranteed for life of installation
- Trouble-free
- Positive separation

Now the Dings Type DA Scrap Separator is available with the new Dings non-electric Alnico Perma-Pulleys—one above and one below the material conveyor to provide simple . . . effective . . . and profitable separation of iron from non-ferrous materials. Most of the iron is lifted from the conveyor by the first pulley . . . and particles which are too small or too deeply buried or entangled are caught by the second pulley—a "double-action" which insures clean separation. Write for full information on how Dings Magnetic Separators can solve your specific problems. DINGS MAGNETIC SEPARATOR CO., 4708 W. McGeogh Ave., Milwaukee 14, Wis.



DUAL PULLEY TYPE SEPARATOR

IRON AUTOMATICALLY REMOVED AND DISCHARGED!
First pulley lifts scrap from main belt conveyor. Any iron missed by this pulley is caught and discharged by second pulley.

Separation Headquarters Since 1899

Dings
"HIGH INTENSITY"

SEE US AT THE FOUNDRY SHOW

(*Concluded from page* 260)

contribute its full value to industry. He has attempted to put each bit of information in the book where the engineer will need to be considering it when working out a production sequence for a product design.

The first few chapters tell what precision investment casting is, what it does, and how it does it. Remaining chapters describe what must be done in product design and redesign in order to get the best results and how the process can be operated to obtain the desired ends.

Resources and weaknesses of the process are described, the predictable lines of its future development are indicated and the practical methods by which the process may be operated on a sound basis are analyzed.

Book Review

Transactions of the American Foundrymen's Association, Vol. 54, 1946, cloth, 872 pages, 8 3/16 x 11 3/16 in., published by the American Foundrymen's Association, 222 West Adams St., Chicago 6.

Containing 98 papers and discussions presented at the 50th annual meeting of the American Foundrymen's Association held at Cleveland in May, 1946, this volume is a worthy contribution to the literature relating to the foundry and allied fields. Papers and discussions cover a wide variety of subjects in the ferrous and nonferrous branches and deal with production methods, properties of various alloys, cores, molding sands, heat treatment, refractories, dust control, design of castings, welding and salvage, operational control, etc. Apprenticeship and training methods as well as time study and human relationship also are discussed. In addition the book also contains the summary of the proceedings of the 50th annual meeting, president's annual address, officers reports, financial statement, and minutes of board meetings.

Acid Open Hearths Make More Steel

Total production of acid open hearth steel for the year 1947 poured both into castings and ingots was 1,257,673 tons according to a recent report of the Acid Open Hearth Research Association. This compares with 1,132,199 in 1946, 1,542,724 in 1945 and 2,107,493 in 1944. According to the report, 53.63 per cent of the 1947 tonnage was utilized for castings and 44.37 per cent for ingots. F. C. T. Daniels, Mackintosh-Hemphill Co., Pittsburgh, is secretary of the association.

GRAFRAM

Plastic Graphite

Ramming Mix of Superior Quality

✔ **LADLES**
For monolithic linings in ladles

✔ **RUNNERS**
For monolithic linings in runners

✔ **PATCHING**
For patching . . . and in all cases where rammed refractories are used in connection with molten metal.

GRAFRAM is a specially developed plastic graphite Ramming Refractory that is economical and efficient.

It is easy to apply, heat-resistant, non-wetting and non-contaminating—has no carbon pick-up.

GRAFRAM is not just another Ramming Mix—but a quality preparation of outstanding performance and longer life as proven by successful application in test after test.

Packed pre-mixed to the proper consistency ready for use and protected in airtight, sealed drums—50 lbs., 250 lbs., and 500 lbs.

Inquiries Invited

THE GRAFTEX PLANT
Division of McFeely Brick Co.
LATROBE, PA.

Home of GRAFTEX BRICK *"Master of Molten Metal"*

THE ADVENTURES OF *Bill*

By PAT DWYER

Drawings by RICHEY

HAVE you ever noticed," Bill inquired the other night, "the remarkable difference between doing something of your own free will, and of being pushed or forced into doing the same thing against your own free will and inclination? In the first instance you jump at the opportunity like a cat in a dairy. In the second instance you put up a holy squall, lift up your voice in lamentation and loudly call on one and all to rally around and donate a bit of sympathy, preferably moistened with a few salty tears."

"Well," I admitted cautiously, 'there have been times when I have felt that a small gob of sympathy would be quite a help in floating over the rough spots. Since I do not see much chance of escaping from the corner pocket into which you have pushed me, and since all you know about sympathy would go in a pig's right eye, I shall take refuge in my constitutional rights and refuse to answer aye, yes or no. However, just to show you that I have a heart of gold and all that kind of thing, and that the milk of human kindness is up to the standard Baume, I shall inquire if you are seeking information, or is your conversational pressure gage just popping."

"Next thing you will be asking me if the subject is animal, vegetable or mineral. You will guarantee to solve the problem if I allow you to ask 20 questions. My answers to be limited to either yes or no. To save you all the trouble and brain fag, I was thinking of the coming convention of the American Foundrymen's Association in Philadelphia, the so-called city of brotherly love. Here I am, the present speaker no less, looking forward with the most pleasurable anticipation to a week more or less under the shadow of William Penn's broad hat on top of the city hall tower and yet I can chant you an old Irish song in which the hero regards a similar trip as a concentrated essence of misery and hardship. He does not actually compare himself to one of the early Christian martyrs, but he does attempt to convey the impression that no one, since the world began, suffered the agony he is suffering."

"It has been many a year since I heard any person chanting 'I'm off to Philadelphia in the mo-o-ornin' and my memory for all the words maybe is not as sharp as it might be, but I do not think the hero of the ballad or come-all-ye said anything about coming to America to attend a convention of the American Foundrymen's Association. That old ditty was composed at a period that is older than I can tell you, and twice as old as you can tell me. In fact I should not be surprised to learn that it was composed under a hedge by a traveling tinker dodging the peelers after a highly successful night among the hares and pheasants. He was in a hurry to get out and did not care whether he landed in Philadelphia, Skowhegan or Hokendauqua. Philadelphia probably was the only name among the three that he could spell or pronounce. The song is illiterate, egotistical and I never liked it."

"Listening to some of this modern radio tripe," Bill said, "practically has ruined your sense of hearing. The old Philadelphia ditty may not be as smooth and slick, for example, as the last rose of summer, but the score is within the range of the ordinary person's voice, and that is quite an important factor. Listen:

" 'Me name is Paddy Leary from a shpot called Tipperary; the hearts of all the girls I'm a thornin.' But before the break of morn, Faith 'tis they'll be all forlorn, for I'm off to Philadelphia in the mo-o-ornin.' Wid me bundle on me shoulder, Faith, there's no man could be bolder. I'm leavin' dear old Ireland widout warnin.' For I lately took the notion to cross the briny ocean, an' I shtart for Philadelphia in the mo-o-ornin.'

"There y'are, me lad. What's the matter with that?"

"The mixture of conceit, ignorance and smug complacency aroused in me about the same degree of pleasure and admiration as I experience when faced with a bottle of castor oil or a pot of senna tea. The opening line violates Item 1 in the *Book of Rules* composed and adopted by the National, Protective, Benefit, Ancient and Independent Union of Ballad Makers of Ireland. Irrespective of the sub-

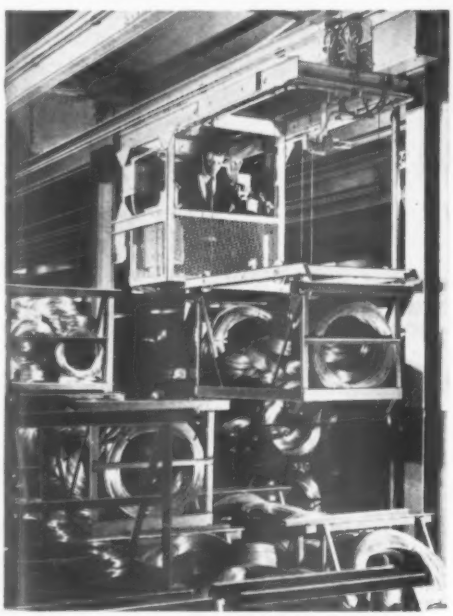
(*Continued on page* 266)

If Mr. O'Leary lands in Philadelphia in time, the convention boys probably will arrange for a repeat performance

AMERICAN MONOTRACTOR CARRIER

IN J. & L. WIRE ROPE DIVISION

SAVES TIME and LABOR
INCREASES SAFETY
IMPROVES QUALITY



Operator of MonoTractor Carrier can deposit or select racks of wire at any spot in the warehouse.

A recently installed American MonoRail Overhead Handling System at the Wire Rope Division of Jones & Laughlin Steel Corporation not only saves time and labor, but also increases safety and improves quality of production.

All manual lifting of coils has been eliminated. Coils loaded in special racks are stacked three tiers high in the warehouse. Operator of MonoTractor Carrier has access to all racks for quick transfer of coils to the winding reels. Labor requirements for materials handling has been substantially reduced. Injuries from lifting have been almost eliminated. Stoppage caused by wire kinks and other damage when handled manually have been reduced by overhead handling.

Let an American MonoRail Engineer show you that automatic handling pays and saves.

THE AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE **CLEVELAND 7. OHIO**

MATERIAL HANDLING News

You'll appreciate why Clark Electric Battery-Powered Fork Trucks enjoy an extraordinary leadership when you consider these basic advantages:

1. **Clark manufactures its own major units**
2. **Clark enjoys the benefit of assembly line production**
3. **Clark provides maximum interchangeability of parts**

Among industrial executives who *know operating costs* of electric fork trucks—taking into consideration initial investment, maintenance cost and operating cost—Clark electric fork trucks are preferred by a generous margin.

These men's opinions may be summarized in the terse comment of one of them—"Clarks cost less!"

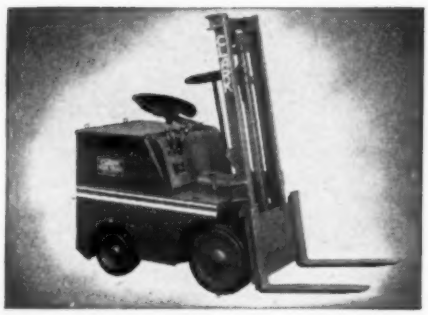
1. VOLUME MANUFACTURE EFFECTS BIG SAVINGS

It is a fact scarcely in need of emphasis to production men that the volume manufacture of Clark machines achieves many important economies. Practically all the major units in Clark machines are produced in Clark's own plants, and on a mass scale—axles, transmissions, wheels, frames and smaller units. All these units must meet the exacting standards established for Clark Products. All possess that rugged excellence that has built the Clark reputation for fine engineering.

Economical assembly saves dollars for customers. Here electrical control gets final inspection.

2. ASSEMBLY-LINE ECONOMIES

A further benefit passed along to users of Clark machines derives from Clark's assembly-line production. Inasmuch as Clark builds both types of fork truck—electric battery-powered and gas-powered—Clark's output is by far the largest in the industry.



Here is electric battery power in fast, maneuverable form — instantly applicable to countless routine assignments.

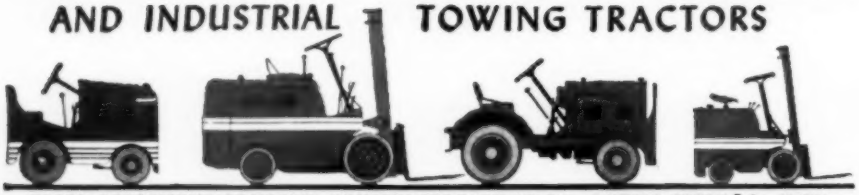
3. INTERCHANGEABLE PARTS

A third potent advantage springs from the maximum interchangeability of parts perfected by Clark. Insofar as is possible, parts used in electric trucks are identical with similar parts of gas powered trucks—a source of important savings to Clark users.

The fact that "Clark builds both" is worthy of repetition, and you realize why. Clark's recommendations are unbiased. You get wholly objective counsel concerning your operations and the types of machines that will serve you most efficiently and economically. Here, indeed, is a good recommendation!—CONSULT CLARK.

How to cut handling costs "to the bone"—in one easy picture-lesson.

CLARK GAS AND ELECTRIC POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS



CLARK EQUIPMENT COMPANY, TRUCTRACTOR DIVISION, BATTLE CREEK 16, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

(*Continued from page* 264)

ject, the opening line of a ballad should read: 'Come All Ye Thrue Hearted hayroes and give one more loud hurrah, for the good ould days when the pass word an motto was Erin-go-bragh. My name is Paddy Leary, from a shpot called Tipperary.' Indeed! Who cares what his name is, or where he came from?

"In the next few lines he offers the smug and gratuitous opinion that all the girls simply were crazy about him and that they all would head for a session at the Wailing Wall when they learned that he was gone. He wouldn't be the first one to pull in his horns, if he could hear what the beautiful little colleens said the following day, while they laid him on a figurative dissecting table and with hearty good will wagged the sharp little acid tipped tongues. That famous line about the colonel's lady and Judy O'Grady still is in good working order whether in Glocca-Mora, Tipperary or Philadelphia."

"You have our hero all wrong," Bill protested. "He had the usual young man's opinion of the fatal dose of charm that attracted all the ladies. He was quite sure all he had to do was crook a finger or do a little bit of discreet whistling and the girls would follow him over the hills and far away, as all the rats in town followed the Pied Piper once upon a time, but that was all on the surface. As a plain matter of fact he worshiped at the shrine of one fair lady, and was beginning to think of taking an option on her charming person, and whatever goods and chattels would be thrown in at the time of the marriage settlement. He does not touch on this gross materialistic angle in the second verse, but modestly confines himself to another yelp about his hard luck: " 'There's a girl called Kate Malone, whom I had thought to make my own, an' to see my little cabin floor adornin'. Sure my heart is sad and weary, how can she be Missis Leary if I shtart for Philadelphia in the mornin'. Wid me bundle on me shoulder, etc.

"I guess," Bill remarked complacently, "that will hold you for a while. I should think that the heart of a graven image would be touched at this picture of a bitter and hopeless parting."

"I may have the heart of a graven image," I said, "but I haven't the wooden head of your pilgrim. What was there to stop him from taking the lady with him, or of sending for her as soon as he attached himself to a Philadelphia payroll? If the big gommoch could not figure out a way

(*Continued on page* 268)

More Used Than Any Other
MERCHANT PIG IRON

Such Preference Must be Merited!

PICKANDS MATHER & CO.

CLEVELAND 14, OHIO

Chicago • Cincinnati • Detroit • Duluth
Erie • Grand Rapids • Greensboro • Indianapolis
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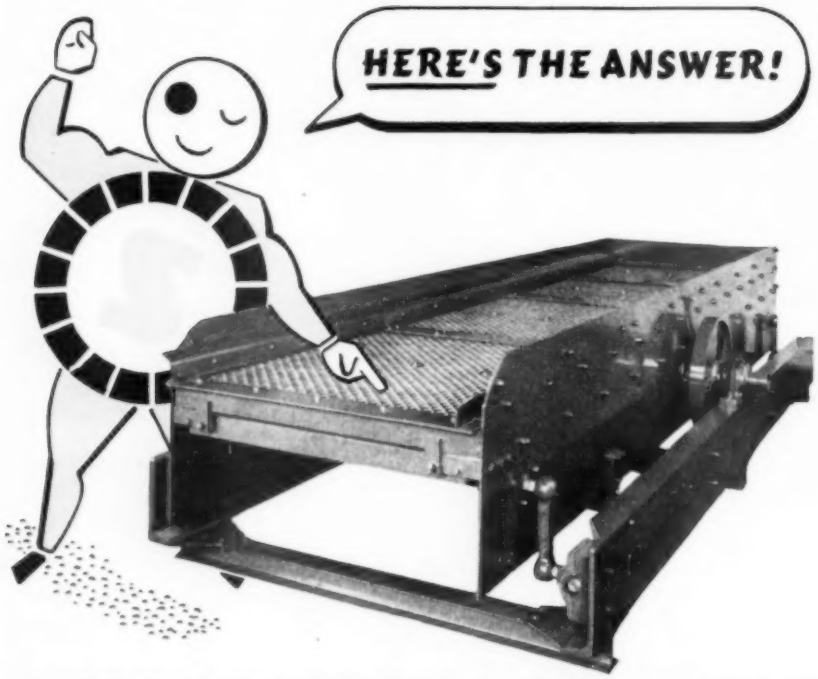
IRON ORE • PIG IRON • COAL • COKE

WHY!

better sand screening with Seco vibrating screens



•SECO'S PATENTED EQUALIZER ASSEMBLY

This Seco engineering exclusive connects the live screen body to the base frame at four points. Result, in operation, is a fully controlled true circular action, that is ideal for screening foundry sand. You'll get years of smooth, trouble-free performance with a Seco Vibrating Screen, proved in use by many leading foundries. Note: Seco's patented construction permits installation at as low as 12° incline, saves head room. Send us your load requirements for our recommendations—or

Write Dept. O for A Guide to Better Screening

TRUE CIRCULAR MOTION VIBRATING SCREENS

SECO

SCREEN EQUIPMENT COMPANY, INC.
PRODUCERS OF VIBRATING SCREENS EXCLUSIVELY
Buffalo 21, New York
In Canada: United Steel Corp., Ltd., Toronto

(*Continued from page* 266)

of solving the problem, why didn't he leave it to Kitty? If she really was interested, she would have him landed in Philadelphia and pushing a wheelbarrow around Baldwin's or Sellers shops at Spring Garden and North Broad streets inside of a month.

"While the point really is of no particular importance, still it constitutes another little weight in the left hand scale of justice by which we measure the value or merits of a composition. In the first verse the lad says his name is Leary, pronounced 'Layree' after the usual Irish fashion to rhyme with Tipperary. In the second verse he calmly pronounces the name Leery to rhyme

Safe from recognition in that costume

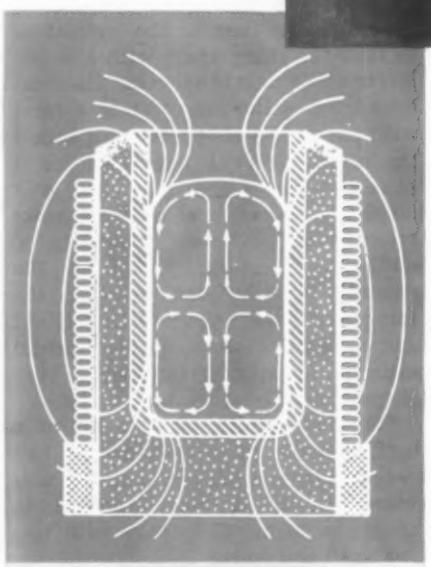
with 'weary'. Of course a possibility exists that the composer, or the printer or the proofreader, or some one gratuitously assumed that whoever attempted to sing the thing would use the Irish version of 'weary' and make it 'warey.'"

"Piffly content of recent objection carefully noted and will now be filed in the second top drawer with the barber's cat, all wind and soap bubbles. In the meantime I can see by the glittering eye, the sharply cocked ears and the drooling lip that you simply are dying to hear the remainder of the old reliable. Brace yourself. Here she comes:

" 'When they told me I must lave the place, I tried to keep a cheerful face, for to show my heart's deep sorrow I was scornin'. But the tears will surely blind me for the friends I lave behind me, when I shtart for Philadelphia in the mo-o-o-ornin'. An' although me bundle's on me shoulder, an' there's no man could be bolder.

(*Continued on page* 270)

QUALITY STEEL



IT STIRS
—AS IT MELTS
NO CHANCE FOR SEGREGATION
NO CONTAMINATION

$$ SAVED BY REDUCED METAL LOSS PAY FOR AJAX-NORTHRUP FURNACES

Fast, clean melting, Ajax-Northrup furnaces insure quality alloys of uniform, exact analysis. Users report regularly that the dollars saved by reduced loss of the high cost alloy constituents quickly pay for the furnace investment.

The ease with which melts can be controlled as to analysis and temperature, coupled with speed and flexibility as to the size of melt, more than justifies the installation of Ajax-Northrup furnaces for quality alloys and often even for specialized melting of lower priced metals. Some installations for cast iron are showing real savings for their users.

FOR NON-FERROUS METALS, TOO

AJAX-NORTHRUP furnaces are equally adaptable for ferrous or non-ferrous melting operations. They are fast becoming standard equipment for the specialized brass foundry.

INVESTIGATE AJAX-NORTHRUP HEAT FOR FORGING, BRAZING, HARDENING, ETC. *Send for new Bulletin 27*

101

AJAX NORTHRUP
SINCE 1916

AJAX ELECTROTHERMIC CORP.
AJAX PARK, TRENTON 5, N. J.

ASSOCIATE COMPANIES
AJAX METAL COMPANY • AJAX ELECTRIC CO., INC.
AJAX ELECTRIC FURNACE CORP. • AJAX ENGINEERING CORP.

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In the Glare of the Torch— think of **WILLSON**

Style CW60

ROOM WANTED FOR SPECTACLES? . . . There's comfort for wearers of prescription glasses in Willson Cover-Alls.* And the adjustable leather bridge rests lightly on the nose without pressure. Willson-Weld* lenses in the shade you specify, of course.

Style RW50

GAS WELDERS GO FOR IT . . . Assured protection of Willson-Weld lenses and comfortable face fit make this goggle day-in, day-out favorite for flame cutting and cleaning as well as welding. Indirect ventilating ports exclude glare.

Style DC50

FOR EYES THAT LEAD A DOUBLE LIFE . . . From welding to chipping with a flip of the wrist! Willson-Weld lenses in separate frames flip up to leave eyes protected by clear, Super-Tough* lenses.

For complete information on these products and their application, as well as many more eye and respiratory protective devices, get in touch with your nearest Willson distributor or write us direct.

*Reg. U. S. Pat. Off.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

DOUBLE WILLSON

PRODUCTS INCORPORATED

Established 1870

237 WASHINGTON ST. • READING, PA.

(*Continued from page* 268)

though I'm lavin' now the shpot that I was born in, yet some day I'll take the notion to come back across the ocean to me home in dear old Ireland in the mo-o-ornin'."

"It is still spinach, and so far as I am concerned you can throw it in the garbage can. Mr. Leary's name does not appear on my list of favorite characters. Too shifty and unreliable. Bears a very strong recemblance to Thomasheen James, the author's man-of-no-work who flitted so joyously through the pages of a certain Philadelphia magazine a few years ago. In the first verse Leary says he tuk a notion to cross the briny ocean, thereby giving the impression that the project was entirely voluntary. He just tuk a notion!

"In the third verse he admits that they told him he must lave the place. He does not say who *they* are, or on what grounds they based the order to get out, and presumably stay out."

"Well," said Bill, "I'll tell you. I never had the time or the inclination to take the thing apart with a screw driver and a pair of pincers. The first time I heard the song was at a farewell party the shop crew organized the night before I left town for a foreman's job in a distant city. For his contribution to a very elaborate program one lad sang 'Philadelphia' and all the gang joined in the chorus. So—you can criticize the composition until your teeth fall out and it won't change my sentimental attitude to what I consider a very elegant piece of work indeed.

"Divided opinion on this bit of a song reminds me of an inquiry I had recently from a foundryman who was wondering if it was practical to charge a 27-in. ID cupola with mechanical equipment. At present the cupola is charged by hand and can be controlled readily. He is doubtful if the control can be exercised as satisfactorily with mechanical charging, unless the scrap and pig iron are broken into small pieces. The charging door is 8 ft above the tuyeres. In a proposed plan the charging bucket on a skip hoist will be filled at the base of the cupola.

"Opinion was sharply divided many years ago when mechanical charging methods and equipment first were introduced in the gray iron foundry. One school, progressive and willing to try anything that promised to reduce labor and resulting cost of operation, pointed to the blast furnace where mechanical charging was universally practiced. They argued that cupolas could be charged in the same manner. The second school, while admitting that blast furnaces

(*Concluded on page* 272)

improve the quality and uniformity of your castings with

CLECO RAMMERS

See our exhibit in booth 617 at the FOUNDRY CONGRESS AND SHOW

For the economy-minded — Cleco Rammers operate with exceptionally low air consumption and low maintenance costs.

Valves are end-pressure-seating in all models and are designed to permit passage of dirt without injury to the valve mechanism. These valves are long-lasting and trouble-free.

Efficient lubrication — highly important in tough, rugged foundry service — is assured by the large built-in oil chamber and flow regulator.

BACK OF CLECO PRODUCTS . . . with 25 years experience in precision manufacturing, is the REED ROLLER BIT COMPANY, one of the largest companies of its kind in the world.

We assure you:
THE MOST ADVANCED ENGINEERING • UNIFORM AND STANDARDIZED QUALITY PRODUCTS • WORLD-WIDE DISTRIBUTION AND COMPLETE SERVICE FACILITIES TRADITIONAL WITH REED.

Write for Bulletin No. 76-B. It describes Cleco Rammers in full detail.

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North • East • South • West . . . It's Schramm

. . . doing jobs like these in Your Field

At almost every turn you need compressed air!

The check list (at right) indicates some of the many compressed air jobs to be done, all of which are accomplished easily, quickly and economically with Schramm Air Compressors.

Here's *why* you profit, as others have, by using Schramm: they're compact, lightweight, easy to start; built for rugged jobs, to provide a continuous flow of air.

Important features include 100% water cooled; mechanical intake valve; forced feed lubrication and easy, electric push-button starting.

Performance everywhere has proved Schramm Air Compressors can do any compressed air job you require. Write today for list of models and sizes.

- Air Hoists, Lifts and Motors
- Core Breaking
- Drilling Salamanders
- Cleaning Castings
- Operating Molding Machines
- Applying Core Paste
- Paving Breakers for Removing Slag from Blast and Reverberating Furnaces
- Pneumatic Hammers and Drills
- Tapping Blast Furnaces
- Wire Brush Cleaning Castings
- Grinding Billets and Castings
- Pneumatic Sand Sifter
- Aerating Metal in Bessemer Process
- Blowing Out Cores
- Chipping Castings and Billets

SCHRAMM INC.

THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA

(*Concluded from page* 270)

were charged with skip hoists, directed attention to the fact that in a blast furnace, the charge from the skip bucket does not fall directly into the furnace shaft. The charge lands first on a cast iron or steel bell which fits closely in the upper part of the furnace. Later the bell is lowered and the charged material slides off uniformly all around. Obviously this complicated arrangement was not feasible in a cupola where the lining has to be repaired and daubed daily.

"Whether a foundryman belongs to the first or second class, the fact remains that mechanical charging equipment is an essential part of every cupola installation in recent years. According to a prominent manufacturer of this type of equipment, a properly designed and operated mechanical charging system will pay for itself in less than 2 years through reduction in labor requirements, saving in materials and elimination of investment in charging floors. In addition to requiring fewer men, the system simplifies the material handling problem by allowing the coke, iron and fluxing material to be loaded in the same bucket. In the light of present day practice with mechanical charging widely distributed on small and large cupolas, the proposed skip hoist installation should serve satisfactorily."

Book Review

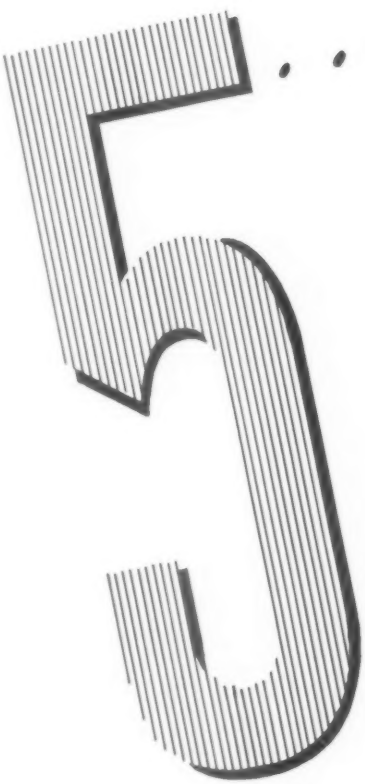
Handbook of Chemistry, edited by N. A. Lange, fabricoid, 2066 pages, 5¼ x 7¾ inches, published by Handbook Publishers Inc., Sandusky, O. Price $7.

This sixth edition has been revised extensively to bring its data up to date, the most important change being that in a table comprising the physical constants of inorganic compounds which has been increased some ten pages to include additional compounds. Other sections which have been extended or rewritten include those on periodic arrangement of the elements, heat and free energy of formation of compounds, ionization constants of acids and bases, electromotive series of metals and alloys, critical constants of gases, factors for reducing gas volumes to normal temperature and pressure, correction for liquid in glass thermometers, true capacity of glass vessels, coefficients of linear expansion, and density of aluminum chloride solutions. Subject matter not included in the previous editions includes modern concepts of matter, numerical values of the gas content and composition of sea water.

Westonite

CHEMICALLY COATED SAND

. . . Another Big 5!



Do you want (1) more sand per hour, (2) more molds per hour, (3) more *good* molds per hour, (4) more good castings per hour, and (5) more cleaned, chipped, ground, and inspected castings per hour?

Then investigate Westonite. It is NOT a "sea coal substitute". Instead, it provides a new molding material.

manufactured and sold exclusively by

EASTERN CLAY PRODUCTS, INC.

Jackson, Ohio

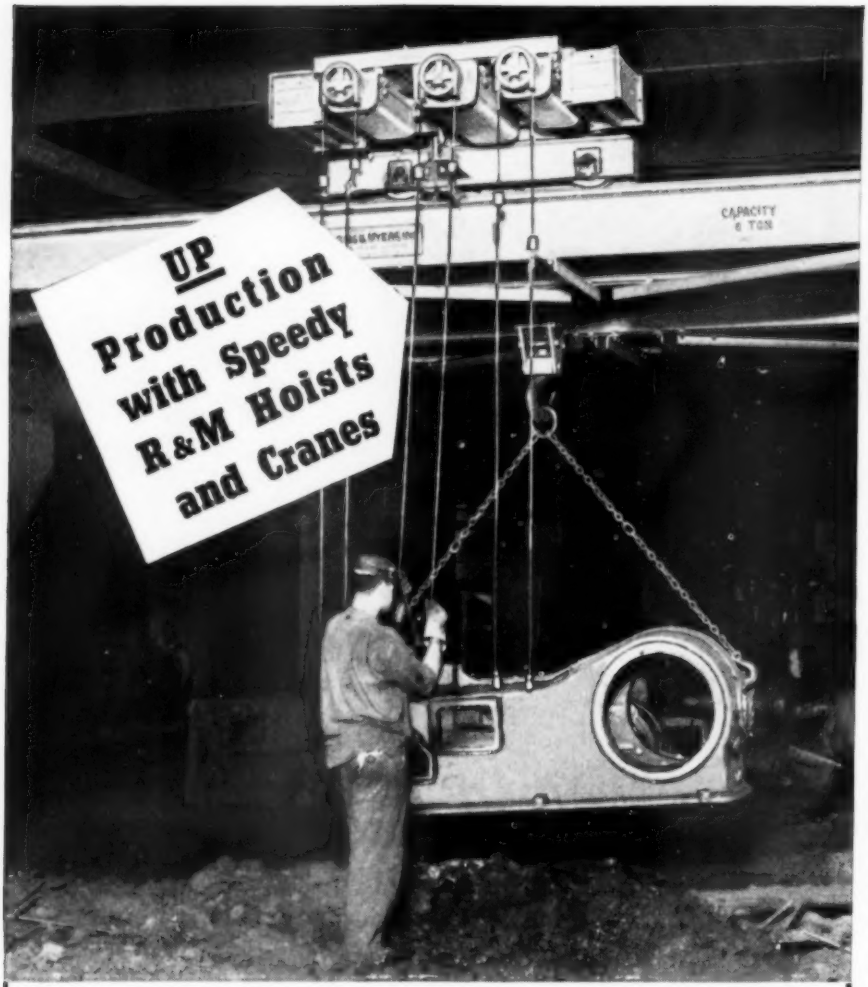
Sales Offices—Jackson, Ohio; Detroit, Michigan and Amory, Mississippi.

Westonite Plants—Detroit, Michigan; Akron, Ohio and Lawco, Ohio.

Producers of Coated Sand — Industrial Silica Corp., Youngstown, Ohio; Walter Gerlinger, Inc., Milwaukee, Wisc.; New Jersey Silica Sand Co., Millville, N. J.; Geo. F. Pettinos Co., Philadelphia, Pa.

Sales Agencies — Hickman, Williams & Co., Inc., St. Louis, Pittsburgh, Buffalo, Erie, Philadelphia, New York and Boston. Brumley-Donaldson Co., Los Angeles, San Francisco and Seattle. Milwaukee — Walter Gerlinger, Inc.; Chicago — Western Materials Co.; Minneapolis — E. R. Frost Co.; Chattanooga — Porter Warner Industries.

See us at Booth 112 in Philadelphia



● Keeping foundry output up to par takes *good* mechanical handling—production-boosting, step-saving labor-aids that are fast and *easy to use*. That's why R & M electric hoists and cranes are such a hit *with every department*, from dock to front office.

R & M's NEVER GET TIRED

These "lifts" are tough . . . built for rugged work . . . soundly engineered throughout. Controls are simple, "natural." Brakes are automatic; hold *without drift*. Power to spare is furnished by famous Robbins & Myers motors. And maintenance is negligible!

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For main bays, side bays, low-headroom areas . . . for lifting or lift-and-travel . . . you'll get *low-cost handling* with R & M's on the job. Call in an R & M specialist for advice on *your* needs. No obligation. Write today.

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Book Review

Mainspring, by Henry Grady Weaver, paper, 228 pages, 5¼ x 7¾ in., published by Talbot Books, Detroit. Price $1.

This book is based on the general theme of Rose Wilder Lane's book, *The Discovery of Freedom*, retold in condensed form by the author and augmented with other material. The title page carries the statement that it is a story of human progress, what it means to you and me and how not to prevent it.

It is a story of people—their faiths, hopes, ambitions, aspirations, and it is also a story of their accomplishments from the days of the caveman on down to and through the present time. It digs beneath the surface in an attempt to find what can be learned from history, as bearing on the effective use of human energy in advancing progress.

It touches upon interesting sidelights on the progress of science and invention and traces the origin of modern mass production to an unsung genius who lived in the 1600's. The book's main emphasis, however, is on what it terms another and far greater invention—the American way of life.

Publishes Standard Welding Symbols

American Welding Society, 33 West Thirty-ninth street, New York 18, has issued its 1947 *Standard Welding Symbols*. Comprising a 72-page booklet divided into 12 sections, the subject is discussed under the following topics: Basic symbols, basic types of joints and welds, general provisions, fillet welds, groove welds, bead welds, plug welds, slot welds, spot welds, seam welds, projection welds, and flash and upset welds. Numerous illustrations with the text matter indicate exactly how the symbols are employed. Copies of the booklet may be obtained for 50 cents each.

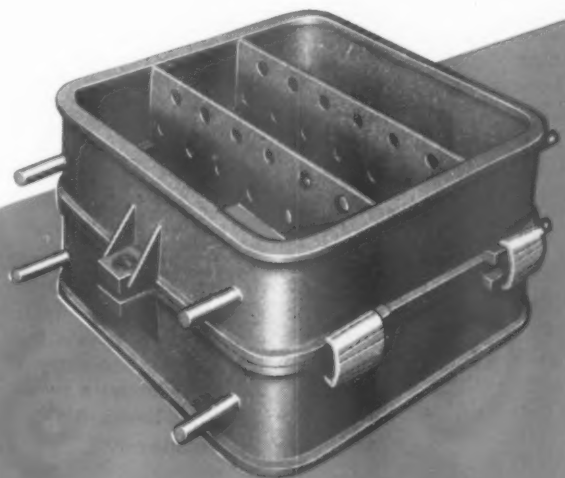
Issues Standard

National Bureau of Standards, Washington, recently released a pamphlet entitled "Cast Aluminum Cooking Utensils (Metal Composition) Commercial Standard CS134-46". It covers the composition of metal and represents the methods of tests therefor, of cast aluminum utensils designed for use in cooking of foods. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, for 5 cents each.

Order 'Industrial'

Get Prompt Delivery on STEEL FLASKS and SLIP JACKETS

Foundry Equipment Built Stronger to Last Longer



★ These heavy duty flasks fabricated of ⅜" plate with reinforcing ribs will stand up under the toughest production runs. They are precision built and are ground at the parting line to insure accurate castings.

★ Industrial ¼" plate flasks illustrated to the left incorporate sand strips at the top and bottom the same as the heavy duty types. Rounded corners, accurate pin hole location and other proven foundry design features make this one of our most popular flasks.

★ Accurate, durable, heat resistant jackets built of steel to last through long production schedules.

Write Wire or Phone your inquiries to your district sales representative

NEW ENGLAND NEW YORK NEW JERSEY EASTERN PENNSYLVANIA — WILSON INDUSTRIES, 38 MEMORIAL DRIVE, CAMBRIDGE 42, MASS.

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INDUSTRY *Briefs*

BUFFALO Stainless Steel Corp. has purchased the Otis Elevator Co.'s foundry and machine shop at Northland and Grider Sts., Buffalo. Company plans to make stainless steel castings for various industries, according to Donald M. Scott, president. The foundry has been idle since December, 1946, and the machine shop was closed last September. Mr. Scott resigned as manager of the Buffalo plant of the Allegheny Ludlum Steel Corp. to head the new company. Ward A. Wickwire is chairman of the board of the company.

* * *

Black, Sivalls & Bryson Inc., 720 Delaware, Kansas City 6, Mo., has reorganized and expanded its foundry equipment department. C. W. Boettcher now handles quotations on special equipment and the expediting of production through the plant. C. C. Zircher handles the processing of orders and keeps statistics on sales and shipments. Production changes have been made to speed the manufacture of steel foundry flasks and allied equipment.

* * *

Havana Metals Inc., Havana, Ill., recently incorporated to produce gray iron castings, has acquired a major portion of the plant, including the foundry, of the Havana Metal Wheel Co., which ceased operations a little over a year ago. Officers of the new company are: George E. Keys, president; John W. Rourke, vice president and sales manager; Wiler A. O'Grady, vice president and plant manager and George E. Keys Jr., secretary and treasurer.

* * *

National Screw & Mfg. Co., 2440 East 75th St., Cleveland, manufacturer of bolts, nuts, screws and other industrial fasteners, has acquired the Hodell Chain Co., 3924 Cooper St., Cleveland, manufacturer of welded and weldless chain. Fred G. Hodell, president, Hodell Chain Co., will remain with the organization and be in charge of the Hodell Chain Division operations.

* * *

Columbiana Pump Co., 131 East Railroad St., Columbiana, O., is adding about 8560 sq ft of floor area to provide space for a cleaning department and a coreroom. Locker room and shower room also will be installed. This is the second phase of an expansion project which will more than double the size of the original foundry.

* * *

Balmor Corp., 3500 Clipper Rd., Baltimore, is improving and expanding its facilities. Capacity of its electric steel foundry is being more than doubled, with a new electric furnace being erected and also a new substation. In addition, new foundry equipment and new machine tools are being installed as a step in the rearrangement of the company's entire plant. A contract for an office addition recently has been let. J. M. Merkle is president.

* * *

Mathieson Alkali Works, New York, is changing its name to Mathieson Chemical Corp. The company has been known by the former name since its establishment 56 years ago, when the services of Thomas T. Mathieson, member of an English alkali manufacturing family, were obtained to supervise construction of a plant and its initial production at Saltville, Va.

* * *

Ace Centrifugal Castings Inc. 2245 The Alameda, Santa Clara, Calif., has been incorporated in Santa Clara county with a capital of $200,000, to manufacture centrifugal castings. Principals are: Steve Walsh, Joseph A. Amori and Albert DeShields, all of San Jose, Calif. The new corporation is represented by John J. Jones, Bank of America Building, San Jose, Calif.

* * *

Bridgeport-Diamond Machine Co., 2362 Main St., Stratford, Conn., has purchased Diamond Machine Co., Philadelphia, and has moved the engineering and sales offices to Stratford. John T. Kilbride, former president of Bridgeport Safety Emery Wheel Co., who sold all of the stock of that wholly owned corporation, is president of the new company.

* * *

Baltimore Foundry & Machine Corp., Charles & Wells Sts., Baltimore, producer of high alloy steel castings, is making plant improvements, including the erection of a one-story addition, 75 x 100 ft, to house a new heat treating furnace. Bernard G. Murphy is general manager.

* * *

Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, has unified all sales and service facilities of its electric truck, hand-lift truck, and dial scale division at the Railway Exchange Bldg., 80 East Jackson Blvd., Chicago 4, under Arthur H. Dobler, regional manager.

* * *

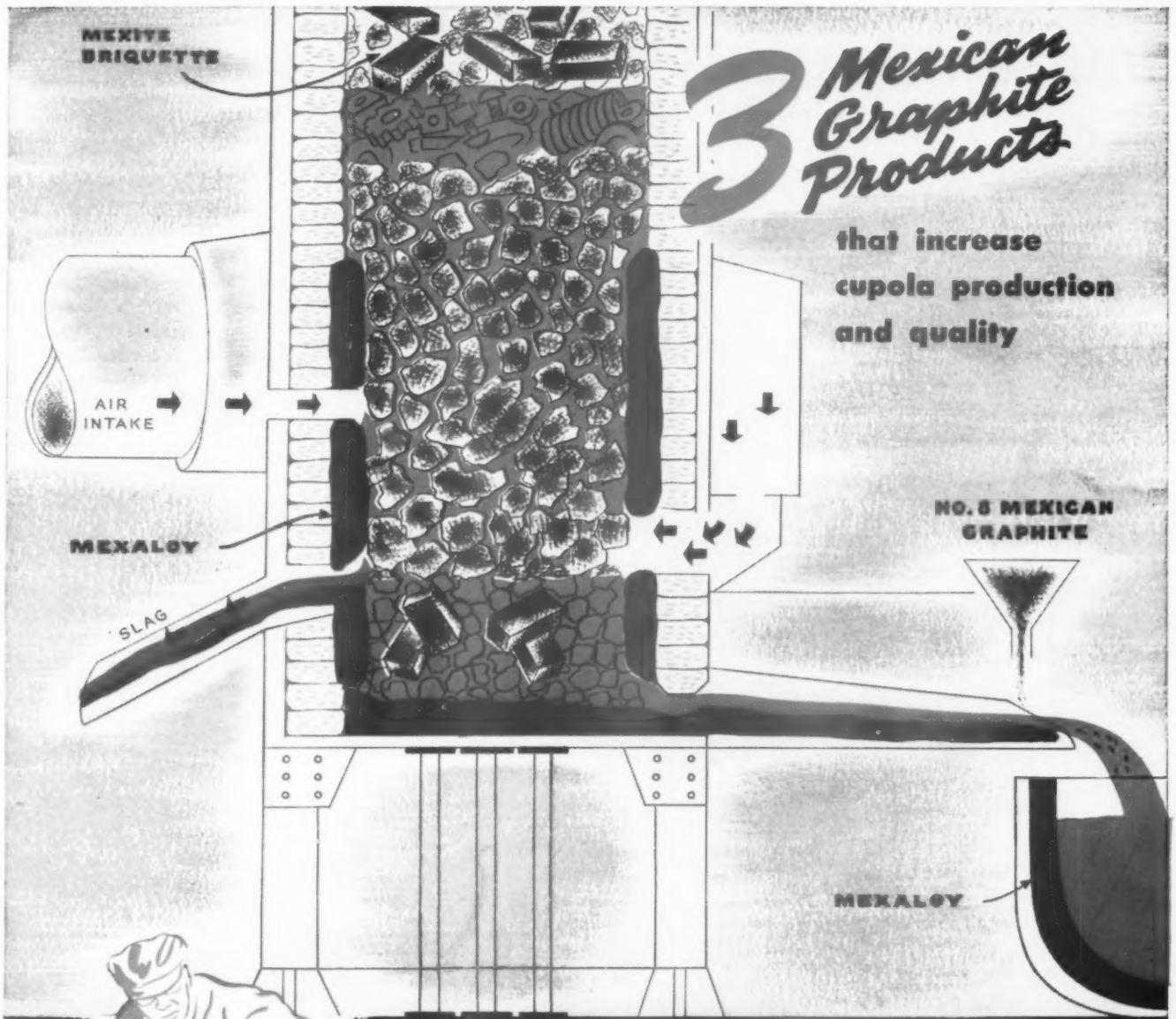
Muncie Malleable Foundry Co., Muncie, Ind., has completed construction of a single-story building, 65 x 150 ft, which will provide additional space for finishing castings and for showers for its workmen.

* * *

Meehanite Metal Corp., Pershing Square Bldg., New Rochelle, N. Y., announces that three foundries operated by I. G. Grawoig & Associates,

(*Concluded on page* 278)

TESTING LABORATORY: A new, modernly equipped laboratory building for studying pilot castings and developing the most suitable foundry techniques for all types of jobs has been put into operation by Michiana Products Corp., Michigan City, Ind. Facilities are provided for general inspection of castings plus radiographic checking



3 Mexican Graphite Products

that increase cupola production and quality

MEXITE BRIQUETTES. One 4-lb. Mexite Briquette provides the same carbon content as 50 lbs. of pig iron when introduced into the cupola charge. Not only do Mexite briquettes sharply reduce melting costs per ton; they also reduce the range of carbon content fluctuation and give a steadier carbon analysis, a particularly vital factor when high percentages of steel are charged.

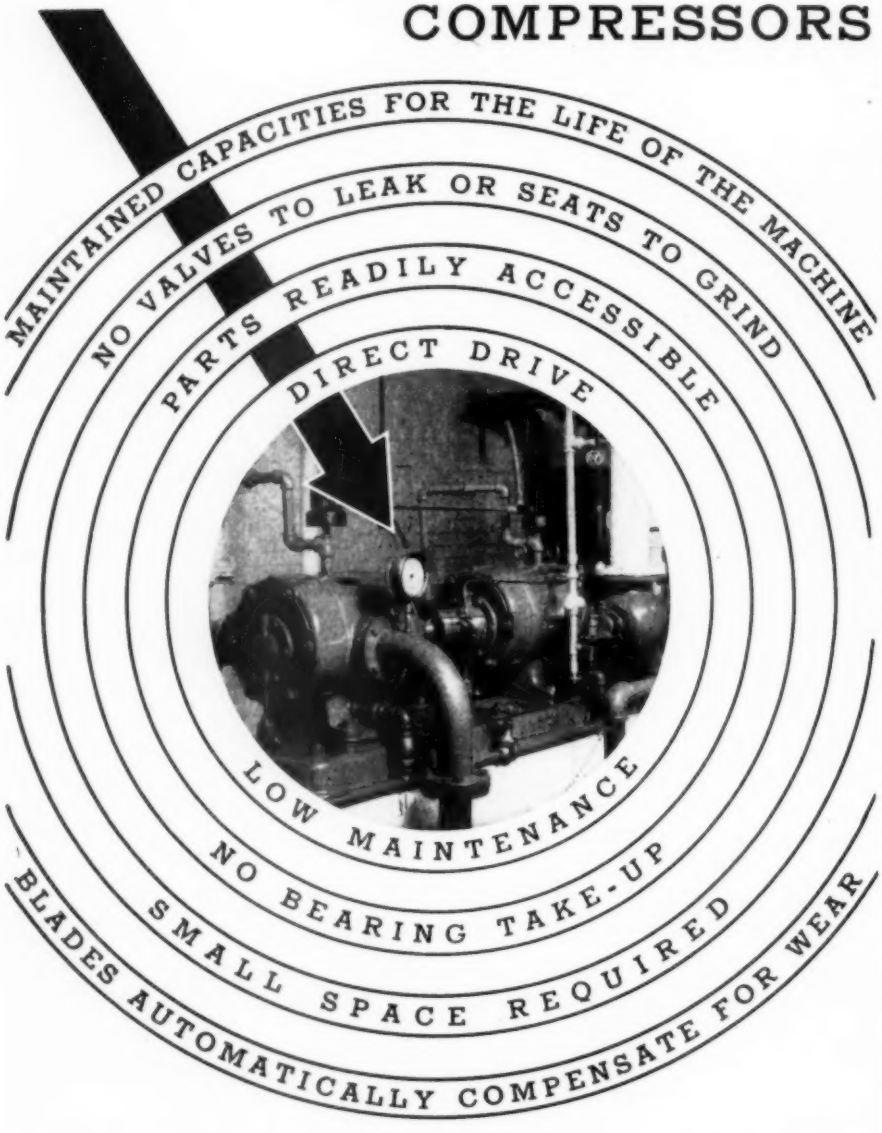
MEXALOY, applied to cupola linings, ladles, and spouts, resists molten metal and slag and keeps metal free from refractory inclusions. Its natural lubricating action provides low friction surfaces which part easily from metal and slag. A Mexaloy mixture is easily applied to any clean surface. Because it will not melt or change character under intense heat, Mexaloy gives longer refractory life with lower maintenance cost.

NO. 8 MEXICAN GRAPHITE is used for ladle additions to treat grey cast iron. Trickled into the cupola spout as metal falls into the ladle or with a direct ladle addition, it greatly reduces chill and hardness, producing castings of increased machineability. Normally only 2 lbs. of No. 8 need be added per ton of molten metal—a cost of only ten cents per ton—to assure castings which require no annealing. Write today for complete information on how Mexite Briquettes, Mexaloy, and No. 8 Mexican Graphite will give you better castings for less money.

THE UNITED STATES GRAPHITE CO. • SAGINAW, MICHIGAN

Visit us at Booth 909 in the Exhibition Hall at the Foundry Congress in Philadelphia May 3 to 7

Hitting the Mark...
FULLER ROTARY COMPRESSORS


MAINTAINED CAPACITIES FOR THE LIFE OF THE MACHINE
NO VALVES TO LEAK OR SEATS TO GRIND
PARTS READILY ACCESSIBLE
DIRECT DRIVE
LOW MAINTENANCE
NO BEARING TAKE-UP
SMALL SPACE REQUIRED
BLADES AUTOMATICALLY COMPENSATE FOR WEAR

Fuller Rotary Compressors differ as radically from the conventional type of compressor as a centrifugal pump differs from the old-line piston pump. They have, in a relatively short period, earned a justifiable reputation as a dependable source of air power, with minimum attention and maintenance, together with sustained efficiencies.

They're built for long, continuous service . . . few moving parts: rotor—bearings—blades. Single and two-stage, for capacities to 3300 c.f.m., actual free-air delivery, pressures to 125-lb.

Write for Bulletin C-5, illustrating and describing these machines.

FULLER COMPANY, CATASAUQUA, PA.
Chicago 3 · 120 So. LaSalle St.
San Francisco 4 · 420 Chancery Bldg.

C-168

FULLER
A LIFETIME OF NEW MACHINE EFFICIENCY

(*Concluded from page* 276)

Chicago, are now producing Meehanite castings. The associated companies are: American Well Works, Aurora, Ill.; U. S. Challenge Co., Batavia, Ill., and Hercules Foundry Division, U. S. Challenge Co., Centerville, Iowa.

* * *

Southern Illinois Foundry Inc. will build a foundry at Carmi, Ill., for the production of stove pots, furnace pots and related castings for North Western Stove Repair Co., Chicago. C. B. Magrath is president of both firms. The foundry building will be 192 x 200 ft and the pattern building 60 x 150 ft.

* * *

Pyrometer Instrument Co. has completed its new plant, laboratory and office at Bergenfield, N. J., and all business is now being conducted from that location. Company's old address was 103 Lafayette St., New York.

* * *

Sam Tour & Co. Inc., 44 Trinity Place, New York, engineers, metallurgists and consultants, is expanding its laboratories and workshops in its building at that address to include two and a half floors of additional space.

* * *

Lake City Malleable Co. has acquired from the War Assets Administration the large malleable iron foundry at Ashtabula, O., which it built and operated during the war for the government.

* * *

Metal Master Foundry, 6510 Bissell St., Huntington Park, Calif., is being operated by William E. Gunason, Albert Lucrezi and Fred Distle.

* * *

George J. Fritz Foundry & Machine Co. Inc., 2008 South Third St., St. Louis, suffered loss estimated at $100,000 in a fire Jan. 24.

* * *

Green Bay Foundry & Machine Works, 401 South Broadway, Green Bay, Wis., plans addition of a chipping room to its foundry.

* * *

American Tool & Foundry Co., Stephensville, Wis., plans a three-story, 50 x 100-ft addition to its plant.

* * *

Donovan Inc., Fifth and Vila Sts., Winona, Minn., suffered $35,000 fire loss to its foundry Mar. 10.

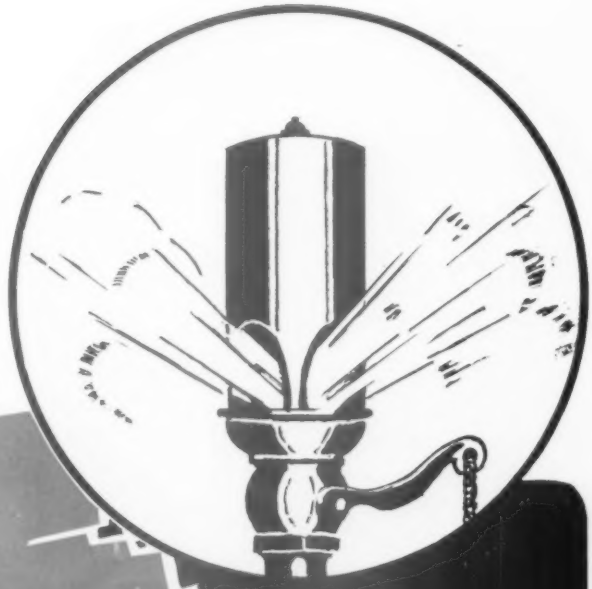
* * *

Indiana Die Casting Co., Elwood, Ind., will build a $100,000 plant. Roy Johnson is president.

* * *

Ohio Brass Co., 380 North Main St., Mansfield, O., is constructing a 1-story, 50 x 150 ft factory building.

For a "new day" in blast cleaning use



20th CENTURY BLAST

SHOT, GRIT

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MODERN FOUNDRY STRESSES GOOD WORK CONDITIONS

(*Continued from page* 125)

used in dumping the molds as will be explained later. Molds without jackets or bands are conveyed almost to the pouring station where aluminum slip jackets, removed from an adjacent line of poured molds, are placed in position. That area is partially shown in Fig. 3, and is an extremely convenient arrangement. Slip jackets have to be carried only about 10 to 12 ft, and there is plenty of room available for piling spare jackets according to size.

Molds are poured from 400-lb ladles suspended from an overhead track. Pouring operators stand on a moving platform whose rate of travel is synchronized with that of the mold conveyor. As may be observed in Fig. 3, the platform is elevated so that it is on a level with the top of the mold pallets on the conveyor cars. This arrangement gives the operator a clear view of the top of the mold and the pouring sprue, and permits pouring the molds with the least effort. Adequate ventilation at the pouring station is provided by two airplane type propellers mounted in the vertical section of the sawtooth roof above it.

Molds Travel Long Distance

After leaving the pouring station the molds pass through the foundry wall to the outside of the building into a covered passage, making a reverse turn and come into the building at a point about 15 ft distant, as may be seen to the left in Fig. 3. At this point the molds are not covered for a distance of about 20 ft, to permit removal of the slip flasks. The conveyor then makes another reverse turn into the covered passage, and travels through the foundry wall for a distance of 40 ft. There a right turn is made and the conveyor travels alongside the foundry for about 250 ft, making another right turn and entering the foundry again. Vertical stacks equipped with exhaust fans are attached to the covered passage at the two points of entry and exit to remove any smoke or gases.

A short distance inside the foundry the conveyor and molds arrive at the shakeout station. There, as shown in Fig. 10, the molds are dumped automatically onto the vibrating grid where sand and castings are separated. The automatic dumper is a simple arrangement wherein a roller

(*Concluded on page* 282)

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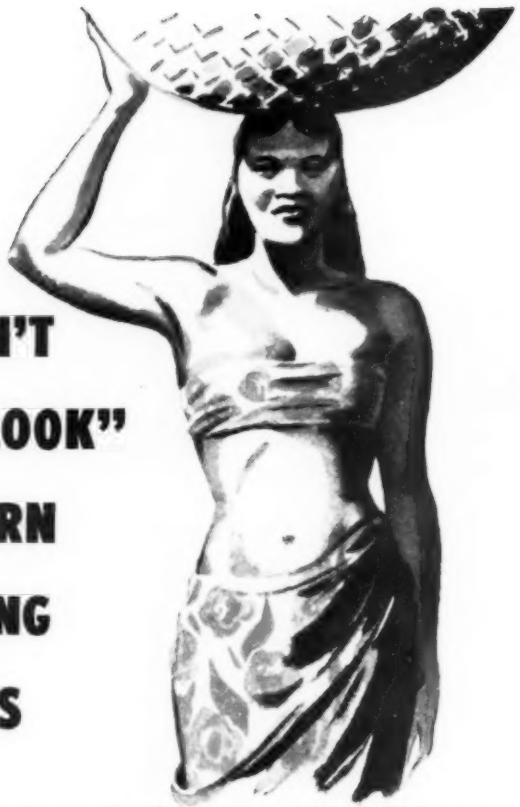

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(*Continued from page* 280)

attached to the mold pallet rides up a steeply inclined section of angle-iron. The pallet, which is hinged at the opposite side tilts at an angle of about 60° at the peak of the incline, and the molds slide off the bottom board which is restrained by raised projections along the edge of the pallet. Just beyond the peak of the rise a compressed-air jet is installed, and is tripped automatically to send a blast of air across the bottom board for removal of any loose sand which may be present.

As may be seen in Fig. 10, the shakeout is hooded and attached to an exhaust system to remove any dust, steam or gases generated during the shakeout operation. Sand drops through the grid onto a conveyor belt, and is carried to the main storage bins. Castings, core butts, and other extraneous material fall onto an apron conveyor, as shown in Fig. 11, where the gates and risers are knocked off the castings and placed in separate tote boxes. Gates and risers are sent to the furnace for remelting and the castings forwarded to the cleaning department. Core butts and other material are carried on the conveyor through the foundry wall and dumped into a tote box (Fig. 12). Approximately 1 cu yd of such material is removed each day.

Castings Are Heat Treated

Some of the castings are heat treated to insure dimensional stability after a following machining operation, and those are placed on the suspended hooks shown in center of Fig. 11. The hooks transport the castings into an elevated continuous type, double-pass furnace where they are heated to a temperature of 1350° F for 30 minutes. After leaving the furnace the castings travel overhead for about 170 ft and then dip down to a few feet above the floor level at the blast cleaning units, where they are removed. The conveyor chain system then ascends rapidly to the elevated position, and continues on to the shakeout station. Total length of the system is around 1000 ft.

Castings are cleaned in two barrel-type abrasive blast units equipped with a power driven loading and unloading device, as shown in Fig. 13. Illustration also shows the castings conveyor line for transporting heat-treated castings. Those not subjected to the heat-treating operation are brought to the cleaning units in tote boxes. After abrasive blasting the castings are placed in tote boxes and carried to the adjoining grinding department where the gate and riser stubs, fins, and any other un-

(*Concluded on page* 284)

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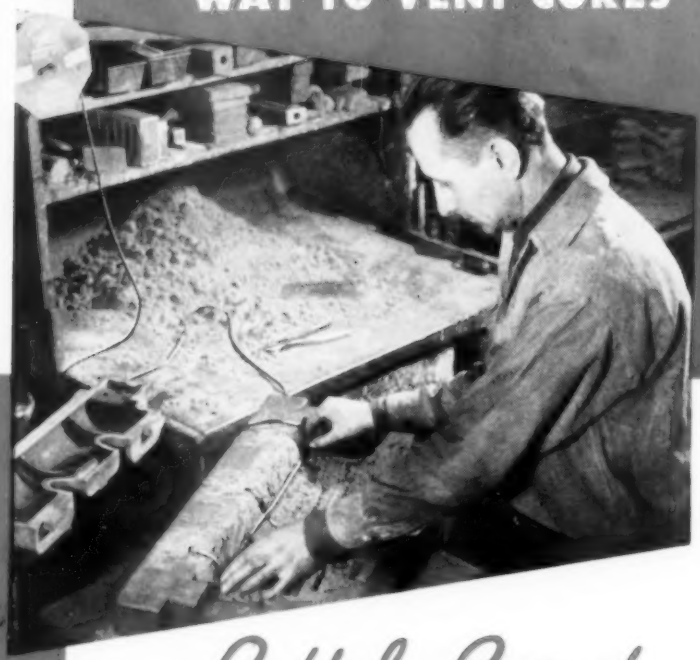

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(*Concluded from page 282*)

desired projections are ground off on three, two-wheel stand grinding machines, and with portable grinders. Following that operation the castings again are placed in tote boxes and transported to the machine shop for further operations.

Cores for the castings are made in a section of the foundry a short distance from and across from the molding machine line, as indicated in the floor plan, Fig. 1. Cores are made on core blowing machines and on the bench. Sand for the cores is stored in bins on the foundry floor level beneath the elevated bins for storing the molding sand. It is conveyed to the mixing muller in buckets suspended from an overhead track, and distributed to the coremaking stations by the same means. Cores are baked in a combination oven (Fig. 7) containing two compartments for handling racks and one section along the side equipped with shelves for baking small cores. A smoke hood extending 5 ft on the rack side and one extending 3 ft on the shelf side are attached to exhaust fans to carry away fumes and smoke when hot cores are removed from the oven for cooling.

An important part of the overall foundry operation is a well equipped laboratory containing sand control and analytical apparatus for metal control. Sand control apparatus includes that for determining moisture, permeability, green and dry strength, etc., while for metal control a spectrograph and densitometer, and sulphur and carbon determinators are used for rapid determination of the composition.

Book Review

ASTM Specifications for Steel Piping Materials, paper, 296 pages, 6 x 9 inches, published by the American Society for Testing Materials, Philadelphia. Price $3.

Containing all the American Society for Testing Materials specifications relating to steel piping and tubing as of December, 1946, this volume in addition includes requirements on castings, forgings, bolting materials and nuts used in piping installations. Forty-six specifications are presented of which 15 cover various types of pipe; 13 are on boiler, superheater and miscellaneous tubes; 3 on still tubes; 3 on heat-exchanger and condenser tubes; 5 on steel castings such as valves, flanges and fittings; 4 on forgings and welding fittings, and 3 on carbon and alloy-steel bolting. In addition a specification on austenitic grain size in steels is included.

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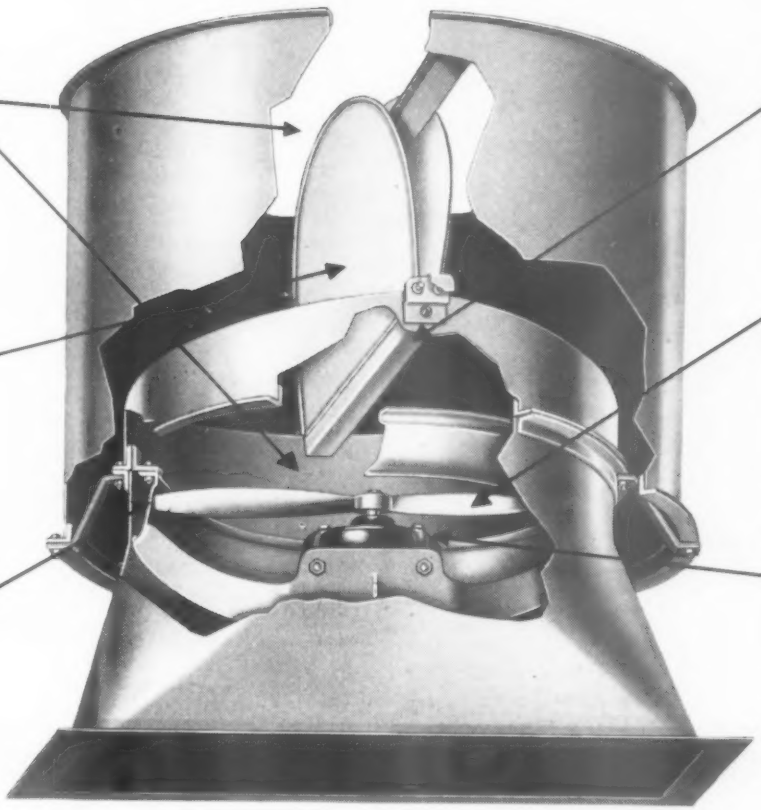

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Fig. 1—Conference Chairman Elmer C. Zirzow, National Malleable & Steel Castings Co.; Prof. K. H. Donaldson, Case Institute of Technology; Chapter Chairman Howard C. Gollmar, Elyria Foundry

Fig. 2—Registration headquarters at the conference

Fig. 3—Part of the audience at the opening meeting

Fig. 4—Some of the approximately 400 registrants

Fig. 5—This meeting on malleable iron was one of 17 individual sessions held during the two days

(Conference photos by Wilfred H. White, Jackson Iron & Steel Co., Jackson, O., and Sterling Farmer, Sand Products Corp., Cleveland)

Foundrymen

Hold Successful Conference

By EDWIN BREMER, PAT DWYER, WILLIAM G. GUDE and ROBERT H. HERRMANN
The Foundry

THE first Ohio Regional Foundry Conference, held in Cleveland, Mar. 11-12, proved successful from the standpoints of both attendance and interest shown in the various technical sessions conducted during the two days. Technical meetings were held at Case Institute of Technology, which joined with Northeastern Ohio Chapter of the AFA in sponsorship of the event. Co-operating groups were the Canton District, Central Ohio, Cincinnati, Toledo and Northwestern Pennsylvania Chapters.

Despite the fact the conference coincided with the winter's worst blizzard and subzero weather, total attendance of approximately 400 was recorded, with a large number of the registrants consisting of out-of-town foundrymen.

Visitors were headed by AFA President Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., and William W. Maloney, AFA secretary-treasurer. Both officers spoke briefly at the conference's opening meeting Thursday morning, which was presided over by Howard C. Gollmar, Elyria Foundry Division, Elyria, O., president of Northeastern Ohio Chapter. Prof. K. H. Donaldson, Case Institute of Technology, also gave an address of welcome.

Main address of the session, on "Recent Developments in the Foundry Industry," was prepared by Frank G. Steinebach, THE FOUNDRY, Cleveland, but, due to illness of the author, was presented by William G. Gude, THE FOUNDRY. Pointing out that the chapter movement is one of the driving forces in extending AFA membership, the chapter activities also function in social, educational and technical developments. While some work has been accomplished in selling the industry to the community, and interesting young men in selecting a foundry career, much more can be done. Chapters also offer a fertile field as clearing houses for dissemination of technical information.

Recent developments cited included work on silicon killed steel in acid electric practice, efforts toward faster melting, use of oxygen in open hearth, electric furnace and cupola, study of melting practice and gas reactions in copper-base alloys, chemically-bonded sand, automatic molding methods, necked-down risers, etc. Lack of adequate labor supply, rising costs, and desire to provide better plants in which to work has led to modernization and mechanization of many foundries, but still more along this line must be accomplished if a satisfactory supply of manpower is to be attracted to the foundry industry.

A luncheon meeting Thursday noon at Tudor Arms Hotel was presided over by Conference Chairman Elmer C. Zirzow, National Malleable & Steel Castings Co. The principal speaker was Dr. Harvey H. Davis, vice president, Ohio State University, who presented a factual discussion of various forms of taxation in a talk entitled "The ABC's of Taxation." He also described briefly the foundry training work instituted at Ohio State, and invited the conference to hold its 1949 meeting at that university.

The Thursday evening banquet attracted practically a capacity attendance. Principal address was a highly interesting and entertaining discussion by Edward A. McFaul, Northwestern University, Chicago, entitled "So You Think You're Slipping."

T. Keith Glennan, president, Case Institute, spoke at the Friday noon luncheon which concluded the conference. He discussed the desirability of close co-operation between industry and engineering schools, and the importance of adjusting the aims of the latter to coincide with the needs of industry.

An educational meeting at the conclusion of the Thursday afternoon technical sessions was presided over

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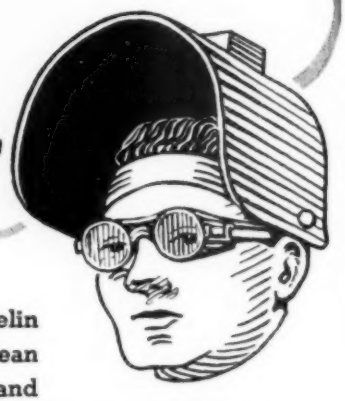

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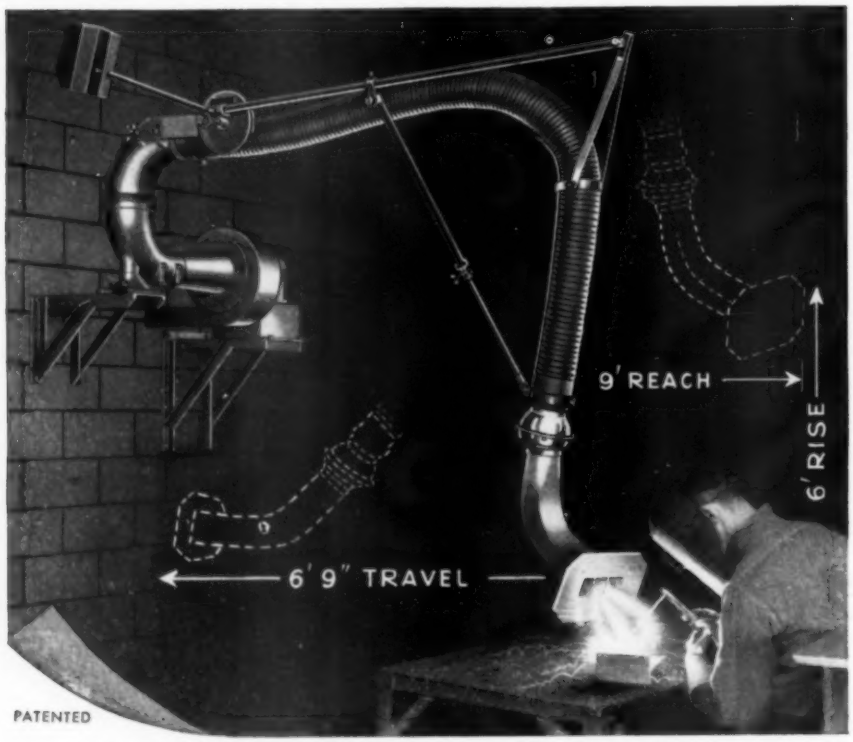

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by Frank C. Cech, Cleveland Trade School, and George K. Dreher, Foundry Educational Foundation. Efficient methods of selecting new employees were described by Prof. Eleroy Stromberg, Cleveland College, who discussed preselection testing practices which have found successful application in foundries. James G. Goldie, M. B. M. Foundry Inc., Cleveland, spoke on various forms of foundry training, and pointed out that size of the plant and type and degree of skill required by the job should determine the choice between short term and apprentice training. However, all foundries should have some apprentices regardless of how few the number, he added.

Prof. K. H. Donaldson discussed briefly the instructional, research and development work being done at Case Institute by undergraduates, graduates and faculty. George K. Dreher spoke on activities of the Foundry Educational Foundation. In discussing job opportunities he stated there is an indicated need in the foundry industry for 10,000 engineering graduates in supervisory positions and that approximately 1000 of these positions become vacant each year and must be filled.

Discuss Steel Melting

First steel castings session Thursday afternoon had Chairman Thomas D. West, West Steel Casting Co., and Prof. Gerald Cover, Case Institute of Technology, presiding. Dr. Clarence H. Loring, Battelle Memorial Institute, Columbus, O., spoke on recent developments in steel melting. He said the physical reaction between carbon and oxygen is dependent upon the carbon in the bath, not on slag composition, and carbon content of the bath must be altered to obtain any change. Sulphur is removed by contact of metal and slag, and stirring is necessary to promote intimate contact. Desulphurizing value of slag is not affected by iron oxide content so it is preferable to have a highly basic slag early in the heat rather than in the refining period for sulphur removal.

Use of oxygen to reduce carbon is not new although in years past high cost of oxygen militated against its application. Oxygen may be used in several ways—in the combustion air, by directing a jet against the surface of the bath, or by injection into the bath. Latter is very efficient with high carbon bath, reduction being four or five times that by regular oreing down practice. In discussing acid electric steel Dr. Lorig indicated that best properties are obtained when the meltdown is kept slightly oxidizing

(*Continued on page* 290)

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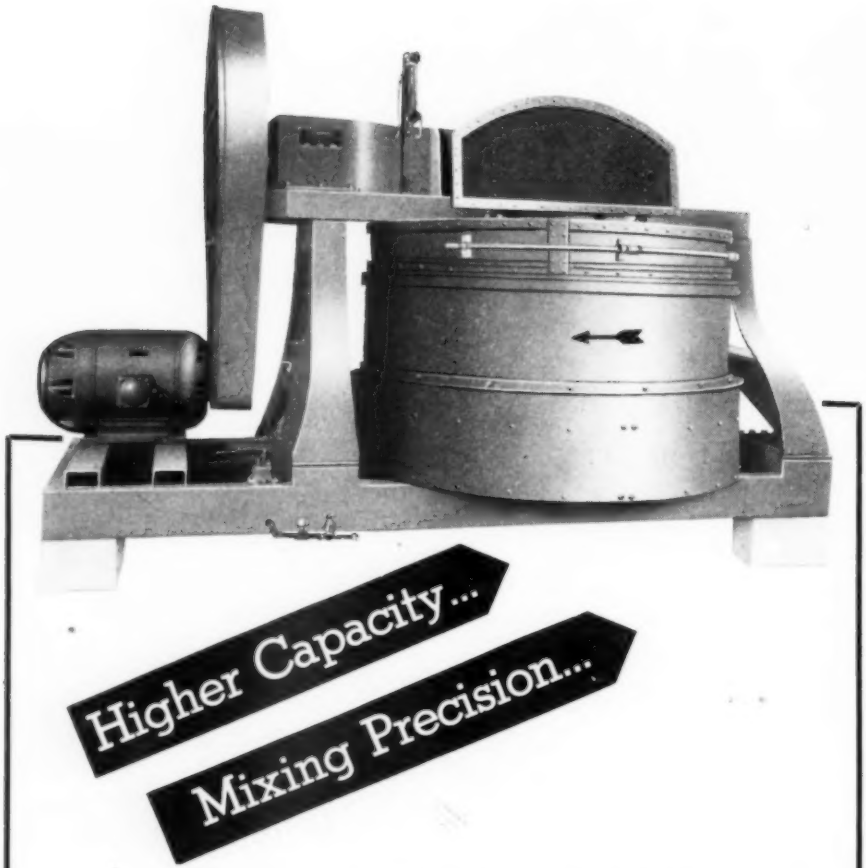

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(*Continued from page* 288)

to minimize gas absorption; carbon should be high enough at meltdown to permit a considerable carbon drop and insure a vigorous boil, and the slag preferably should have an intermediate viscosity.

Other topics discussed by the speaker included effect of hydrogen and methods for keeping that element at the minimum, use of Washburn or necked down risers, Williams risers, nonmetallic inclusions, heat treatment, and high temperature resisting alloys for use in jet engines, etc.

Prevent Hot Tears

Second steel meeting was held Friday morning with I. M. Emery, Massillon Steel Castings Co., Massillon, O., and Thomas D. West as co-chairmen. Charles W. Briggs, Steel Founders' Society of America, Cleveland, discussed hot tears in steel castings, stating that not much information is available on exact causes since it is difficult to develop equipment for making high temperature tensile determinations. Tears are of two types, internal and external, and are formed after the steel has solidified by stresses caused by improper design, manner of cooling and hindrance to contraction. Cures for elimination of hot tears include keeping stresses low in cores and molds; seeing that the design is such that a closed system of stresses is not developed, providing an ample allowance for good feeding, seeing that the steel is of high quality, employing chills to prevent hot spots, using cracking strips, and having the pouring temperature consistent with the casting design.

Final steel session followed, with Prof. Douglas Williams, Ohio State University, Columbus, O., and Thomas D. West as the chairmen. Speaker was C. A. Sanders, American Colloid Co., Chicago, who talked on steel sand mixes for molding. He advocated a grain distribution on four or five screens rather than on two or three as generally used, since such a sand gives better characteristics when subjected to the action of hot metal. It also will permit a reduction in the amount of bond, cereal and silica flour which is necessary to produce satisfactory castings. Mr. Sanders said that if coarse sands are used clay is preferable as the binder, since too much bentonite would be required. He also said that many foundrymen have found that mixing the binder in slurry form before adding to the sand gives improved results.

The first session on malleable iron had John W. Clarke, General Electric Co., Erie, Pa., as chairman, with B. C.

(*Continued on page* 292)

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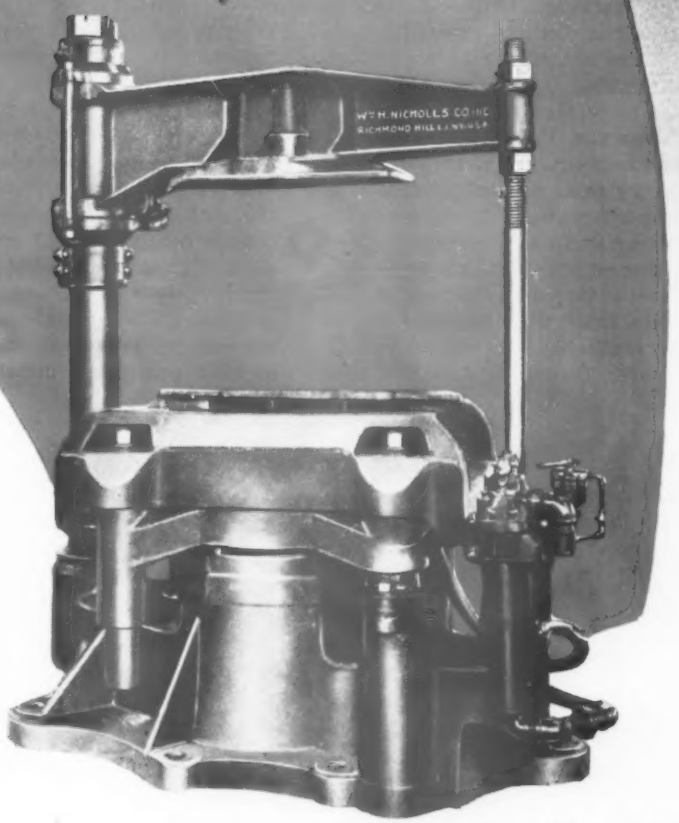

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NICHOLLS

(*Continued from page* 290)

Yearly, National Malleable & Steel Castings Co., Cicero, Ill., the speaker on "Cracks in Ferrous Castings. Their Causes and Possible Remedies." Mr. Yearly pointed out that cracks are caused by the casting's inability to contract normally in all sections. Hot cracks usually occur at above the critical temperature; cold cracks develop near room temperature but are caused by conditions existing at above 1200°F.

Design Is Important

Cold or strain cracks can be eliminated by proper design which will permit efficient gating. Heating the casting to 1300°F and holding it at that temperature until dimensional stability is attained, followed by cooling in the air, also was suggested. In correcting hot tears attention should be directed toward factors which restrain the metal beyond its ability to stretch. The degree of packing of the sand can influence prevalence of hot tears, while excess pouring temperature also makes castings more susceptible to such defects.

"Effect of Boron on Malleabilization of White Iron" was discussed at the second malleable session, with J. J. Witenhafer, Columbus Malleable Iron Co., Columbus, O., chairman. The paper, presented by H. A. Fabert and Joseph Micksch, students at Case Institute, comprised results of a study of irons containing varying additions of boron and subjected to different annealing periods. Micrographs indicated that with boron content of 0.005 to 0.01 per cent, the pearlite is about gone and graphite is present in small particles. A dendritic pattern of the graphite and carbide starts to appear at 0.03 to 0.05 per cent B. Graphite size increases with boron content up to about 0.002 per cent but decreases with further additions.

The concluding malleable iron session consisted of an illustrated talk on "Modernization and Malleable Melting Practice" by W. R. Jaeschke, Whiting Corp., Harvey, Ill. Mr. Jaeschke traced the development of duplex melting practice, stating that 45 duplex installations now exist in the United States and Canada. Of this total 40 consist of the cupola-air furnace combination. Of all melting in the malleable iron industry 67.4 per cent is continuous, 7.7 per cent consists of cupola malleable and the remainder is air furnace batch type melting. The speaker showed numerous slides illustrating typical melting equipment installations and discussed operating details which provide the most efficient melting.

A Very Old Process

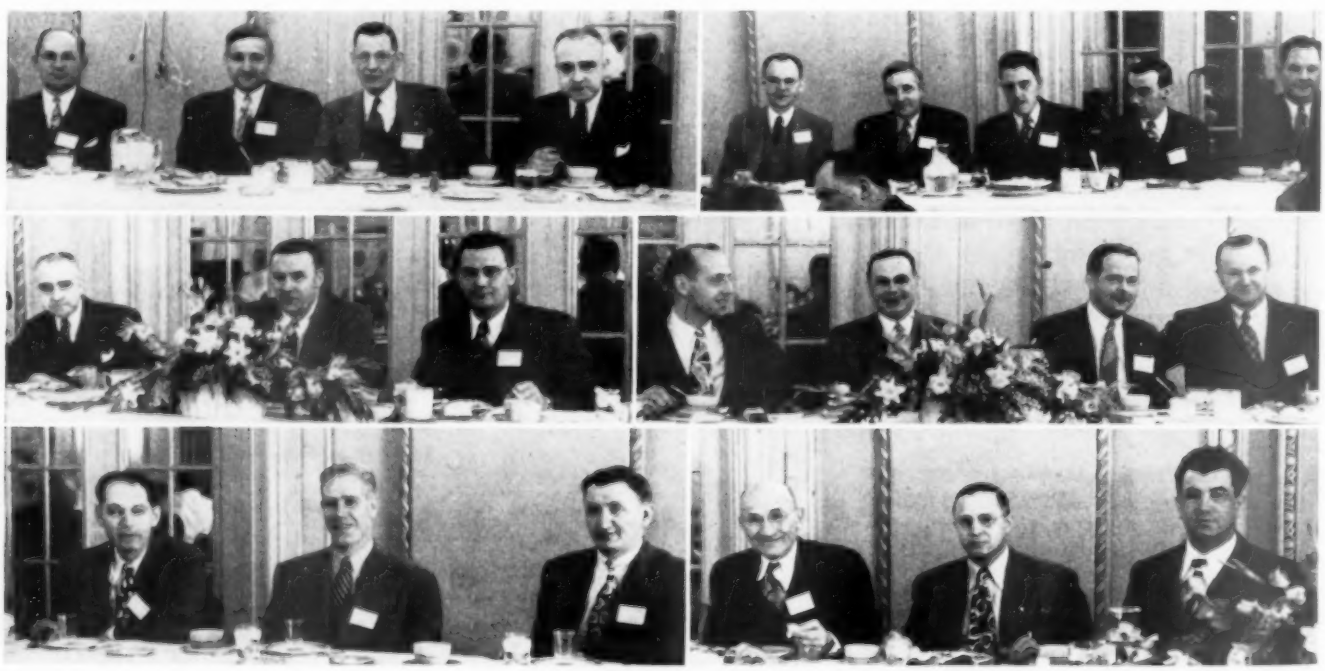
At the first patternmaking session Morris Bean, Morris Bean Co., Yellow Springs, O., discussed "The Use of Gypsum Bonded Molds." He outlined briefly the history of plaster mold development from 4000 B.C. to the present. In commenting on the lost wax process for making molds, he said that the process essentially is the same as 1500 years ago.

Mr. Bean's talk dealt mainly with molds made from materials used in the liquid form, poured around the pattern. Such materials usually have a gypsum base and often contain 20 to 50 per cent inert material mixed with the plaster. In many cases 2 to 3 per cent of short fiber asbestos is added to strengthen the mold.

He went on to say that, generally speaking, tolerances of plus or minus 1/1000 in. per in. can be held. The degree of accuracy, however, depends on the size and complexity of the casting to be made. Closer tolerances can be held in small castings than in large castings.

Mr. Bean stated that there is much

(*Continued on page* 294)



Ohio Conference luncheon and dinner scenes. Left to right, *top row:* A. B. Barczak, Bardes Forge & Foundry Co., Cincinnati; T. D. West, West Steel Casting Co.; J. H. Tressler, Hickman, Williams & Co.; J. G. Goldie, M.B.M. Foundry Inc.; H. F. Scobie, AFA; T. D. West; H. A. Fabert and Joseph Micksch, Case Institute students; T. Keith Glennan, president, Case Institute. *Center row:* J. G. Goldie; Ernest Kindt Jr., Kindt-Collins Co.; V. J. Sedlon, Master Pattern Co.; Prof. Eleroy Stromberg, Cleveland College; F. Ray Fleig, Smith Facing & Supply Co.; R. D. Walter, Werner G. Smith Co.; G. K. Dreher, Foundry Educational Foundation. *Bottom row:* Prof. Douglas Williams, Ohio State University; Walter Sicha, Aluminum Co. of America; Thaddeus Giszczak, AFA Cupola Research Committee; Peter Rettig, Rettig Pattern Co.; Carl Winkler, Standard Pattern Works; Ladd Salach, Plastic Corp. of Chicago

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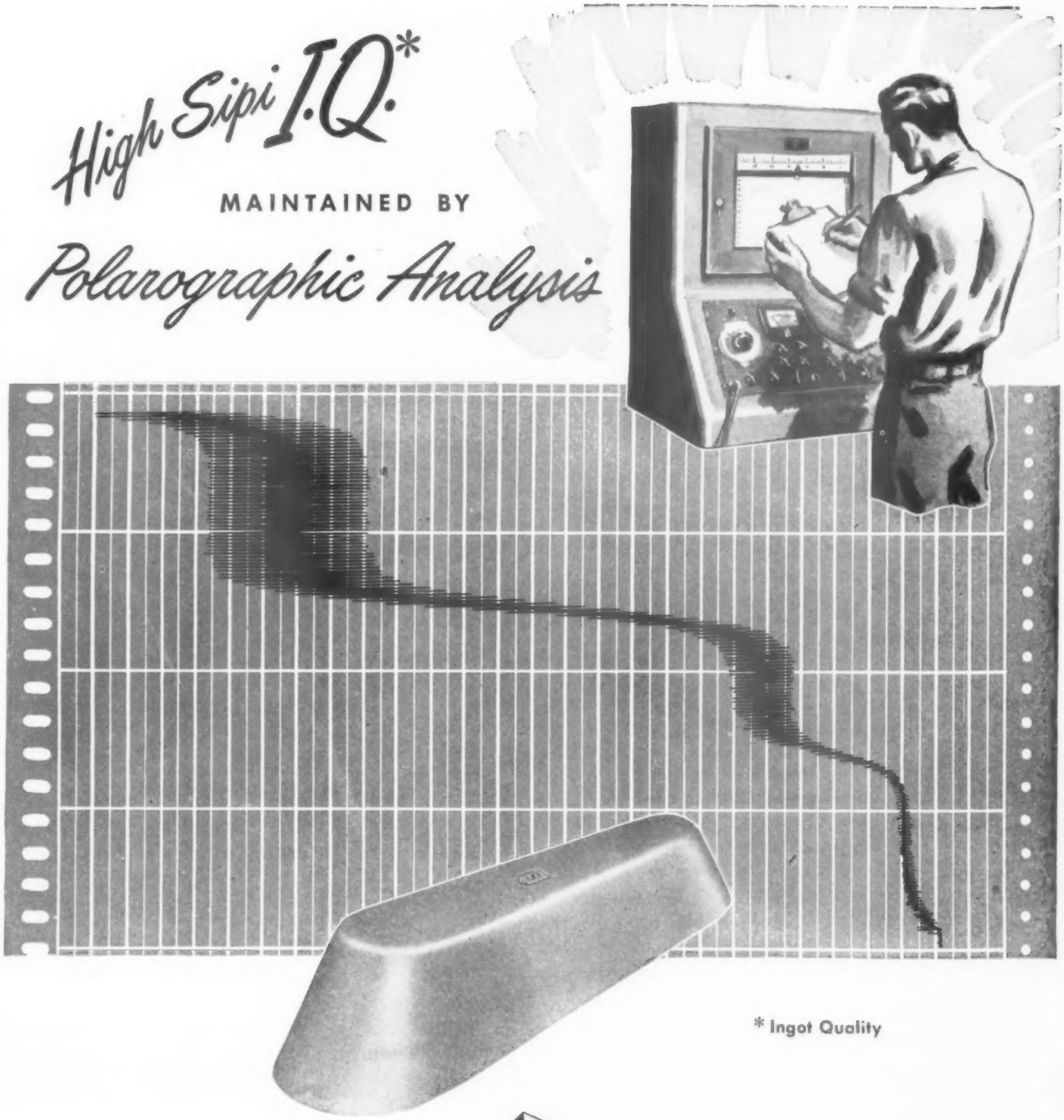

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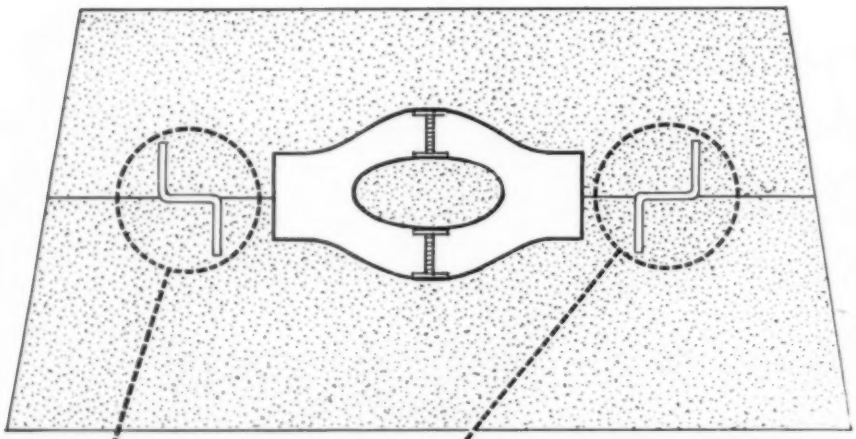
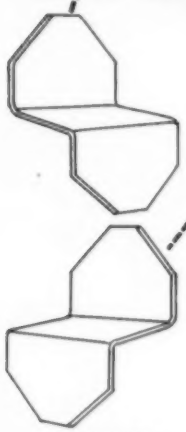
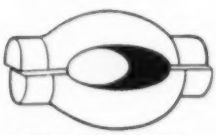


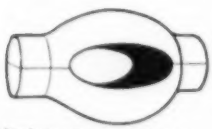
Stop that Shift between Cope and Drag with MILWAUKEE MOLD ANCHORS



MILWAUKEE MOLD ANCHORS
(Patent Applied For)



Shifts Make Scrap! Note how slight shift between cope and drag causes misalignment of upper and lower halves of castings.



Perfect alignment of cope and drag "stops that shift."

Here is a new remedy that's highly effective, costs little, actually saves you money. Molds made in slip-flasks and snap-flasks are often subject to rough handling. First, removing the flask frequently results in jars or vibration. Then there are the bumps and jolts on conveyors . . . the unequal pressure of warped or dented jackets . . . and other handling operations.

Any or all of these factors can cause a slip or shift between cope and drag along the parting line . . . costly slips that show up in the finished castings . . . slips or shifts which result in too high a percentage of scrap castings.

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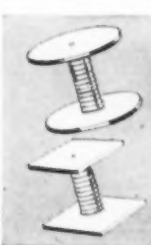

MILWAUKEE CHAPLET

A 5355-2⅝

(*Continued from page* 292)

room for improvement in patterns. In his 19 years of experience, Mr. Bean said that he has never made a perfect casting, because he hasn't been able to get a perfect pattern. He spoke of the need for metal matchplates of good accuracy and no porosity. In his opinion, matchplates made from the new plastic materials meet the requirement of no porosity but do not hold dimensions too well.

Attendance at this meeting was approximately 55.

Ernest Kindt Jr., Kindt-Collins Co., Cleveland, spoke before approximately fifty men at the second patternmaking session. His subject was "Patternmaking—Past, Present and Future."

According to Mr. Kindt, there are about 15,000 patternmaking shops in the United States and Canada, and those in this country account for about 4 per cent of the nation's industrial production. Improvement in patternmaking methods and general progress of the industry is slow, in Mr. Kindt's opinion. He said that this is due to the fact that some patternmakers are rugged individualists; they hesitate to try new methods and products, and dislike joining organizations where they would have the opportunity to exchange ideas and opinions to the betterment of the entire industry.

Discussed Four Phases

Mr. Kindt discussed four phases of the patternmaking industry—production, employer-employee relationships, materials and selling. Most shops, in Mr. Kindt's opinion, are poorly or inadequately equipped to get maximum production. With respect to personnel, he said that one of the reasons for price differentials between patternshop quotations on the same piece of equipment is the variation in the amount of work done per hour by the men in different shops. He went on to say that it is impossible for an employer to buy initiative, loyalty or genuine interest from his employees. Those things must be earned.

In discussing materials, the speaker said that the industry must find substitutes for pattern wood (other woods or synthetics) because the short supply of pattern wood is likely never to improve. Because patternmakers hesitate to try new products, Mr. Kindt believes that there should be a central testing bureau for examining new products and which will put a stamp of approval on acceptable products. Patternmakers then would have more confidence

(*Continued on page* 296)

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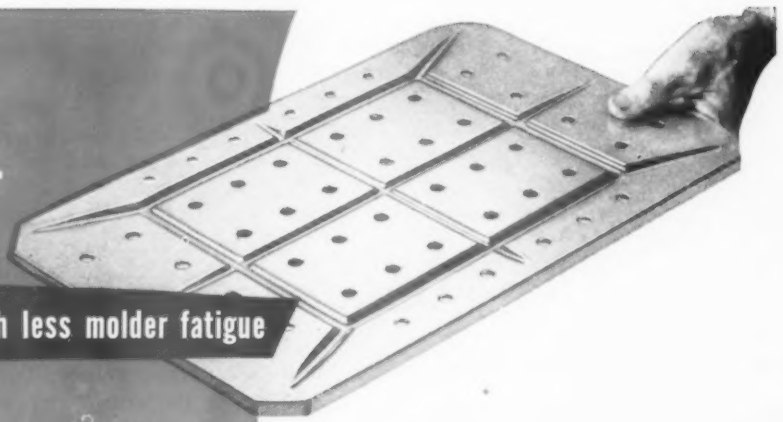

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(*Continued from page* 294)

in the ability of new products to fulfill their purpose. In addition, Mr. Kindt feels that there should be standardization of all products and terminology in the foundry industry.

In conclusion, Mr. Kindt said that to operate a successful pattern business, a patternmaker must be more than a good craftsman; he must be a good business man and a good salesman.

"Plastics as Used in Patternmaking" was the subject of Ladd Salach, Plastic Corp. of Chicago, who spoke before 60 men at the final patternmaking session Friday. He described plastic patterns made from a mix consisting of a liquid phenol formaldehyde thermosetting resin, a catalyst to stimulate the exothermic heat reaction which controls curing of the resin, and a filler used to increase impact strength of the solidified resin. This material, he said, can be cast into the finest and most intricate shapes.

Some of the qualities claimed for patterns and coreboxes made from this material are durability, extremely smooth surface, no condensation when placed in contact with warm sand, and economy.

According to Mr. Salach, the original phenolic resin used in patterns and coreboxes contained no fillers, and shrinkage problems were encountered. With plasticizers and asbestos fibre fillers now used the original shrink is 0.002 in. per in. and aftershrink is controlled to 1/10 of 1 per cent in 6 months.

Mr. Salach exhibited a number of plastic coreboxes and matchplates and showed a movie of such matchplates in operation in a foundry.

Vincent J. Sedlon, Master Pattern Co., was chairman of the various patternmaking sessions, with the following serving as co-chairman and discussion leaders: Frank C. Cech, Cleveland Trade School; Peter Rettig, Rettig Pattern Works, and Carl Winkler, Standard Pattern Works.

Modern Cupola Practice

At the opening gray iron session, under the joint chairmanship of J. G. Goldie, M. B. M. Foundry Inc., and F. W. Fuller, National Engineering Co., Thaddeus Giszczak, research metallurgist of the AFA cupola research committee, discussed some modern trends in cupola operation. Following a brief history of the research committee, and the publication of the *Cupola Handbook*—a book, by the way, on which the committee still is at work with a view of issuing a later and revised edition—the speaker launched into his main theme.

Assuming that his hearers were familiar with the actual operation of the cupola, Mr. Giszczak pointed out that the present day foundryman is confronted with a type of compound problem unknown to his father and grandfather. Customers are demanding higher class castings. Pig iron and coke makers on whom the foundryman depends, cannot supply an adequate amount of these raw materials.

Touching on the coke situation, the speaker said his committee is working closely with the Canadian Bureau of Mines in an attempt to develop a practice in the utilization of coke formerly considered undesirable. Eventually, and the date is not far distant, this is the only kind of coke that will be available. Extensive investigation indicates that nearly all deposits of bituminous coal peculiarly adapted to the manufacture of coke are practically exhausted.

Other features touched upon by the speaker included errors due to lack of proper supervision on the charging floor, effect of gas ratios, mixing ladle in front of cupola drained and refilled, importance of proper slag, introduction of oxygen, foreign work on hot blast. He concluded by an admonition to foundrymen for concerted action to get more and better raw materials.

Casting Loss Is Serious

Henry J. Trenkamp, Ohio Foundry Co., Cleveland, and A. B. Barczak, Bardes Forge & Foundry Co., Cincinnati, alternated as chairman at the second session, where W. B. McFerrin, Electro Metallurgical Co., Detroit, presented a masterly description and analysis of casting defects. He stated that the subject really is serious and deserves more attention than it usually receives. With a production of 13 million tons of castings in this country this past year, a loss of only 1 per cent meant 130,000 tons. Based on an average and fairly conservative estimate of a 5 per cent loss through some form of casting defect, the nation lost the use of 530,000 tons of castings, and the foundrymen lost a corresponding amount from the black ink figures on the right side of the ledger. Blame for this condition was laid about equally on the working force and on the management.

Taking three typical foundries as examples, an old time hand molding shop making a miscellaneous line of castings, a modernly equipped production shop, and a third shop where the management exercises the closest control and insists on every job being done according to the strictest rules and regulations. Mr. McFerrin claimed that the third shop, recently organized and manned by a group of GI's has the lowest scrap record of the

(*Continued on page* 298)

NORTHEASTERN OHIO: Top photo is a general view of the banquet held at the Cleveland Club, Cleveland, Mar. 11, in connection with the Ohio Regional Foundry Conference. Edward A. McFaul, Northwestern University, Chicago, speaker at the banquet, is shown in lower view holding a tie which he used to illustrate a point in his talk

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Some Typical LANLY Ovens

FIG. 1 — A Lanly Shelf Type Core Oven. This unit is heated by means of burners located directly under the work chamber. Available in several standard sizes.

FIG. 2 — A Two Compartment Car Type Mold Drying Oven. Each compartment individually heated and controlled.

FIG. 3 — A Rack Type Oven which accommodates two racks side by side with a single set of doors. Installed where space limitations do not permit separate openings for each rack.

FIG. 4 — Three Compartment Rack Type Oven is equipped with combination oil gas burner equipment. The change from oil to gas or vice versa can be made in a few minutes.

FIGS. 5 & 6 — A Combination Shelf. Drawer and Truck Type Oven. Heat is furnished by one efficient Lanly forced convection system.

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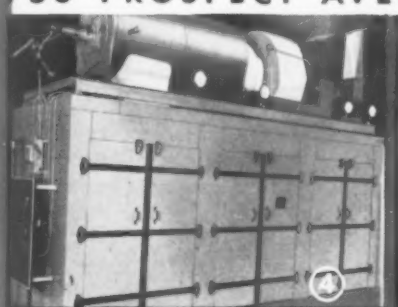

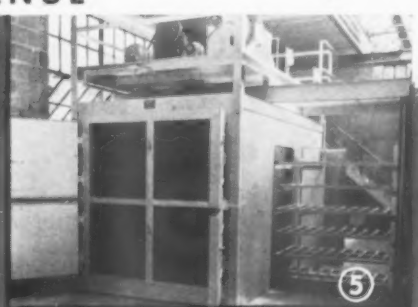

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(*Continued from page* 296)

three. Requisites for efficient operation of any foundry include: Intelligent selection of employees, proper equipment, adequate supervision over each department, use of only patterns that harmonize with general conditions in the shop; where necessary insist on changes in design or pattern construction. The talk was illustrated by charts, and by the list of defects, their causes and remedies, first developed several years ago by H. W. Dietert, Detroit, and under several auspices later.

"New Applications in the Foundry" was the subject chosen for presentation by R. G. McElwee, Vanadium Corp. of America, Detroit, at the third gray iron session, under the chairmanship of J. G. Goldie, M.B.M. Foundry, Inc. The speaker deplored the present situation in the foundry field, where the operators are handicapped severely by their inability to secure raw materials, either in quantity or quality. He regretted that no prospect of relief was indicated in the near future. Under the circumstances the skill, ingenuity and resourcefulness of the foundryman will be taxed to the limit in his effort to produce satisfactory castings. Several interesting examples from the speaker's personal experience as professional adviser and trouble shooter indicated that the conservative, and in some instances more or less antagonistic attitude of the supervisory force, handicapped his efforts.

Referring to the use of anthracite coal in the cuopla he stated that up to the present no definite rules of procedure had been worked out or recommended. A lot of loose rumors and gossip are prevalent, but it would be advisiable for each man to conduct his own investigation. It might not be out of place to mention that anthracite coal was used exclusively in the cupola for many years, before coke became available.

Harking back to the remarks of a previous speaker, he also emphasized the importance of slag control, especially under present conditions where the foundryman is forced to piece out the regular pig iron and scrap charge with whatever is available. Following a fluent and scholarly discussion of cast iron metallurgy, influence and relationship of the various elements, and the effects of alloy additions, Mr. McElwee declared present conditions will not be improved until foundrymen unite and bring pressure to bear in the proper quarters to insure a greater and better supply of raw materials.

Alloys for Many Uses

The first of three nonferrous sessions was devoted to a discussion of "Commercial Aluminum Casting Alloys" by Walter Sicha, Aluminum Co. of America. The meeting was presided over by Walter Bonsack, Apex Smelting Co. Cleveland Plant, and Walter J. Klayer, Aluminum Industries Inc., Cincinnati. Mr. Sicha described the various commercially important alloys on the basis of chemical compositions, outstanding characteristics and uses. Comments on relative casting characteristics, machinability, resistance to corrosion, mechanical and other properties constituted a major part of the lecture.

Principal uses for individual alloys, with indication of the casting process employed, were illustrated by slides showing several aluminum alloy castings representing both familiar and new applications. Some historical data afforded an opportunity to trace the development of aluminum alloys that are currently important.

At the second nonferrous session C. F. Bunting, Pitcairn Co., Barberton, O., and Walter Bonsack were

(*Concluded on page* 300)

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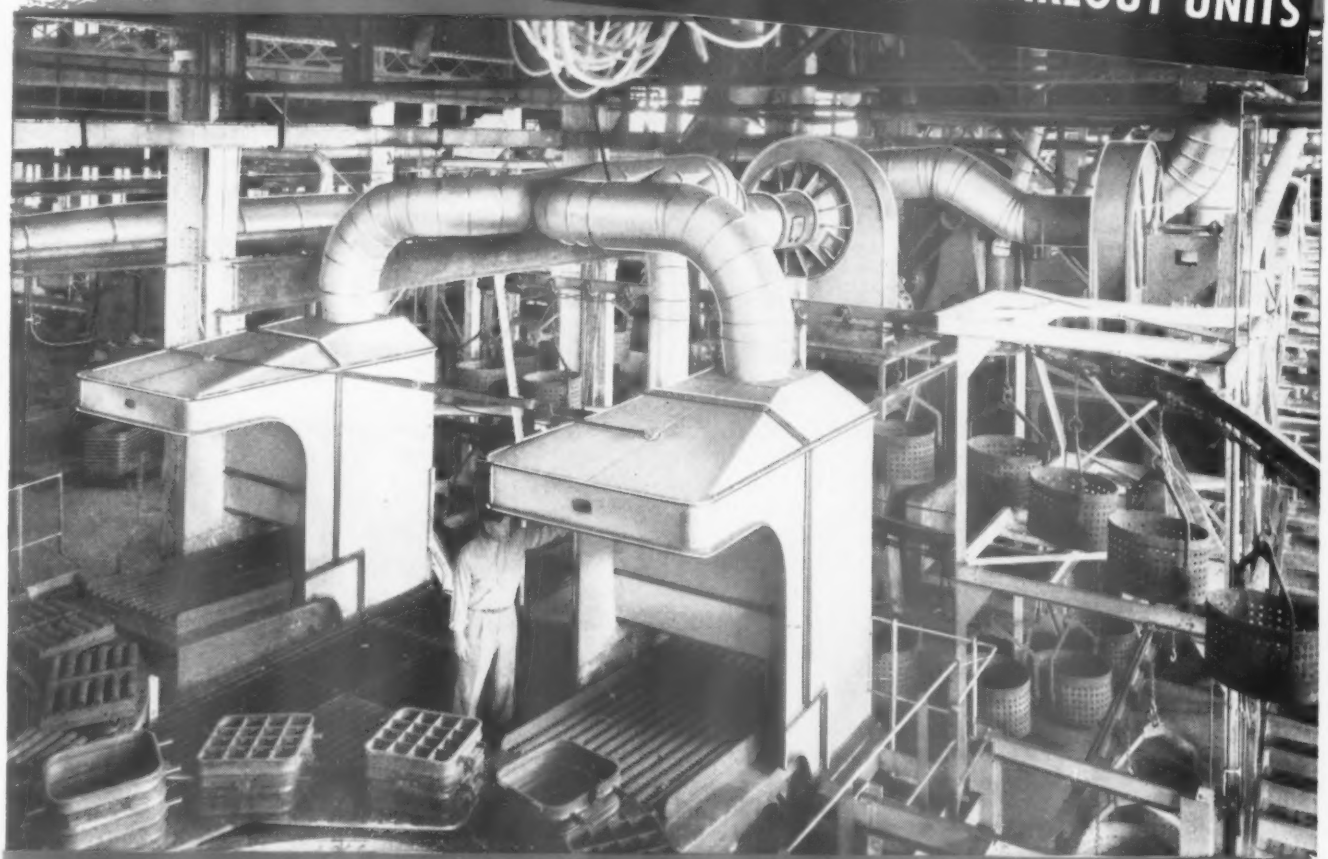

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Typifying modern foundry practice are the methods and equipment used in the large midwestern foundry illustrated above. And prominent among this modern equipment are five separate KIRK & BLUM Dust Control Systems. The unit illustrated is installed on the production line shakeouts. Note how the equipment has been designed for non-interference with foundry production.

Castings move along inclined shakeout grate, opening hinged gate automatically by contact, and castings drop into conveyor baskets.

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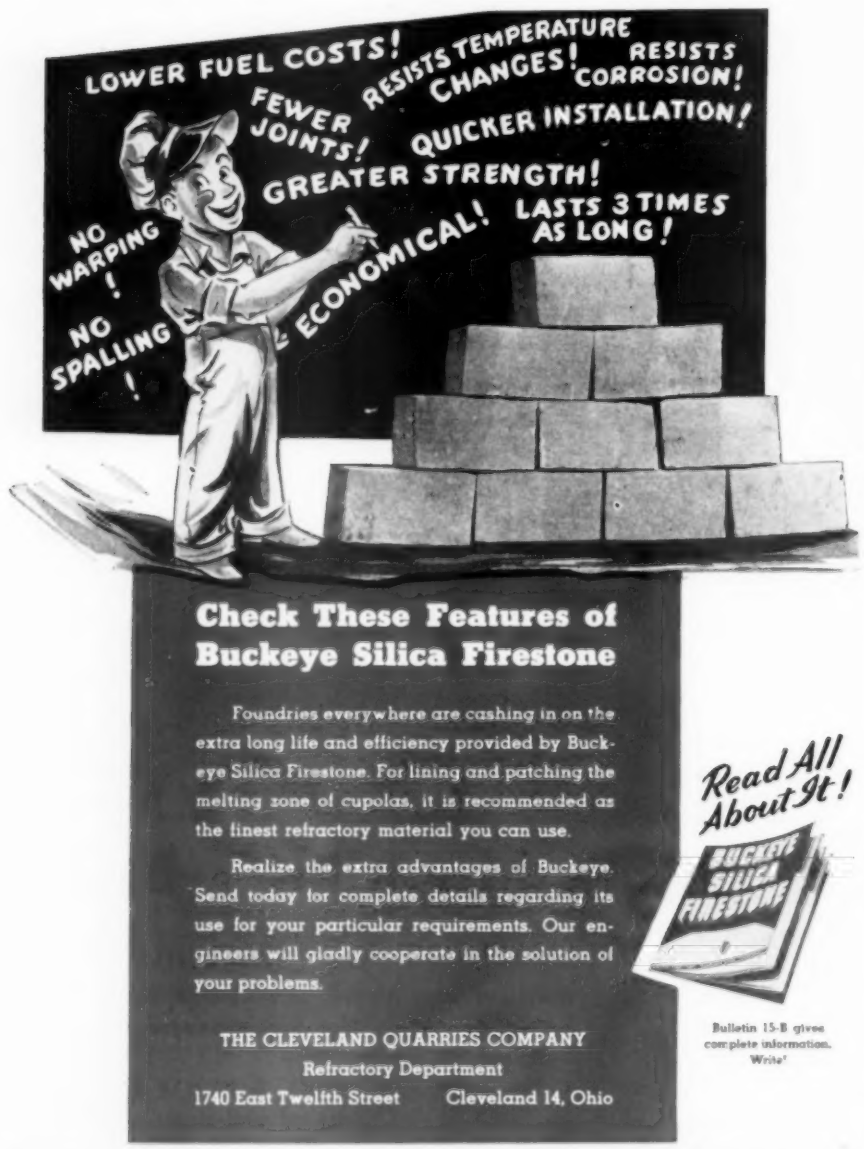
DUST CONTROL SYSTEMS

(*Concluded from page* 298)

chairmen, and H. L. Smith, Federated Metals Division, American Smelting & Refining Co., Pittsburgh, spoke on brass and bronze melting practice. He said that a few thousandths per cent by weight of hydrogen constitutes a large volume of water vapor, and produces considerable porosity in the casting. Hydrogen, oxygen and carbon which react and cause trouble are introduced by the products of combustion of the fuel. With high hydrogen in the melt, reaction of metal with moisture in molding sand produces porosity in the castings.

Melts can be gassed or degassed by the reaction between copper and water vapor. Procedures to eliminate or minimize gas absorption include control of the oil or gas flame to insure a nonreducing character which may be checked by inserting a piece of cold zinc and looking for a carbon deposit; use of a small addition of zinc or phosphor copper (dry) to the bottom of the crucible which form products that sweep deleterious gases from the melt. Mr. Smith also pointed out that metal with low gas content shrinks more than one containing a higher gas content, and it is necessary to provide additional feeding to insure solid castings.

"Electronic Baking of Foundry Cores" was discussed at the concluding nonferrous session by J. W. Cable, Induction Heating Corp., New York. This session had Walter Bonsack and G. N. Wright, John Harsch Bronze & Foundry Co., as chairmen. Mr. Cable described the application of this rapid type baking whereby high-cycle current provides baked cores in periods ranging from seconds to a few minutes. Although not adapted to baking cores of all sizes, the electronic process offers advantages as a supplementary unit for the foundry requiring mass production of smaller cores of similar size and shape. Other advantages claimed include reduction in number of core mixes and shorter mixing time; better core surface; accurate dimensions; reduction in gas generated when casting is poured; need for fewer driers and wires.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Corporation Opens New Division

Hewitt-Robins Inc., New York, has started a new division, Robins Engineers, to handle contracting phases in the design, engineering and installation of complete material handling and processing plants.

Harold Von Thaden is head of the new division; Elmer C. Salzman is in charge of sales, and R. W. Eichenberger is in charge of the Chicago office. The 50 engineers assigned to the section formerly were associated with the concern's Robins Conveyors Division. The new division has headquarters at 157 Chambers St., New York.

Book Review

Modern Management Practices and Problems, paper, 48 pages, 6 x 9 in., published by American Management Association, 330 West 42nd St., New York 18. Price $1.00.

Booklet is a review of current policies, practices and problems in seven fields of business and industrial management: Production, distribution, finance and economic planning, labor relations and personnel administration, office management and administration, insurance, and packaging and merchandising.

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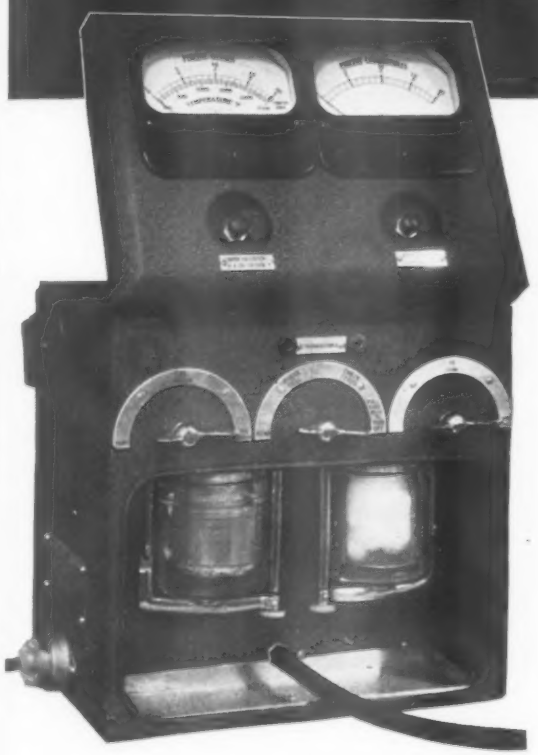

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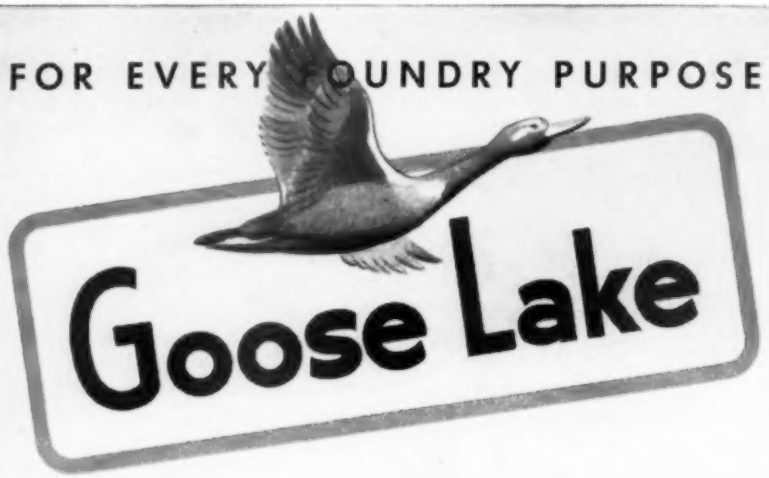
Book Review

The Story of Scrap, by Edwin C. Barringer, cloth, 152 pages, 5⅛ x 8¼ inches, published by the Institute of Scrap Iron & Steel Inc., 1536 Connecticut Ave., Washington 6.

This interesting volume portrays the basic facts of the scrap industry coupled with semitechnical descriptions of the leading scrap-consuming processes, and is well worth the short time to read it. Throughout the book the author presents interesting facts, such as that at present over 1½ billion gross tons of ferrous materials, ranging from the common pin to the largest locomotive, are in existence in the United States with one railroad having more than 5 million tons of steel track; and that in a good year as much as 24 million gross tons of iron and steel scrap is handled by dealers and brokers.

Divided into fifteen chapters the first five describe the industry in general, sources of scrap, role of dealer and broker, consumption of scrap, and historical aspects. Then follow five chapters on semitechnical discussions on how scrap is used in open-hearth, bessemer and electric furnaces, in the blast furnace, cupola, and malleable iron furnace, with one on use of stainless steel scrap, and miscellaneous uses. World trade in scrap is the topic of chapter XIV, while specifications for scrap are presented in the final chapter. Two tables giving statistics of the scrap industry, and calculated metal values in scrap, pig iron and alloys conclude the book.

FOR EVERY FOUNDRY PURPOSE



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JOLIET, ILLINOIS

Conveyors Covered By Safety Code

The first nationally acceptable safety provisions for the construction and operation of mechanical conveyors and conveying equipment have been compiled by the American Standards Association, 70 East 45th St., New York 17.

The experience of a wide variety of national groups concerned with the manufacture and use of conveying equipment and with the safety of workers in plants using this equipment was called upon in preparing the recommendations. These groups were represented on the ASA committee which worked under the leadership of the National Bureau of Casualty and Surety Underwriters and the American Society of Mechanical Engineers.

Book Review

Best's Safety Directory for 1948, cloth, 494 pages, 8½ x 11 in., published by Alfred M. Best Co., 75 Fulton St., New York 7. Price $5.

Covering the field of safety, fire protection and control, hygiene, first-aid and sanitation, this illustrated directory shows what safety products or devices to use for specific hazards, how to use them and where to get them. Its indexing and subject-grouping system facilitates the location of safety products even when the user is not certain of the type or name of the product needed.

Lists Laboratories

National Bureau of Standards, Washington, has issued a complete listing of commercial and university testing and research laboratories in the country, with indications of the type of commodities tested. Entitled "Directory of Commercial and College Laboratories," and designated as publication M187, it may be obtained from the Superintendent of Documents, Washington 25, for 30 cents.

The NEW WAY to go....

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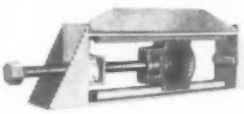
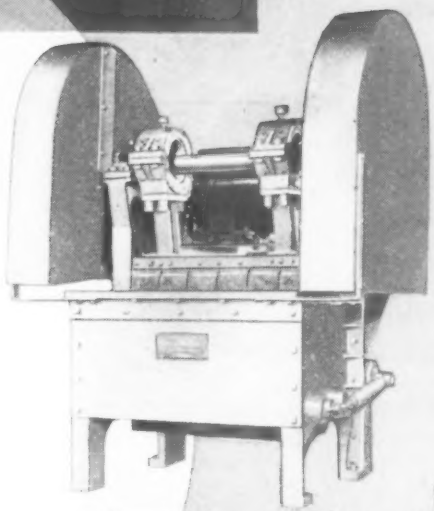
TOWARD FOUNDRY PROFITS

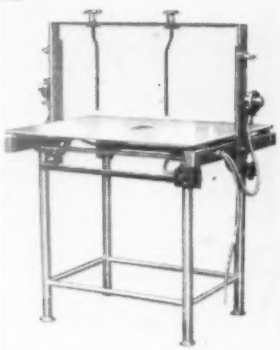


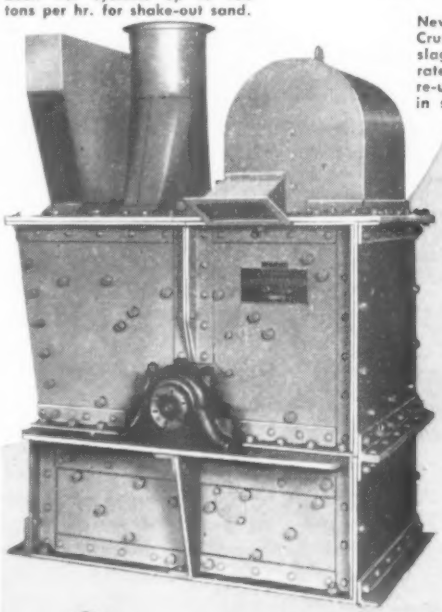
Newaygo Conveyor and Elevator Take-Ups—Self-aligning Roller, ball or plain bearings, for all standard shafts, 6" to 24" travel.



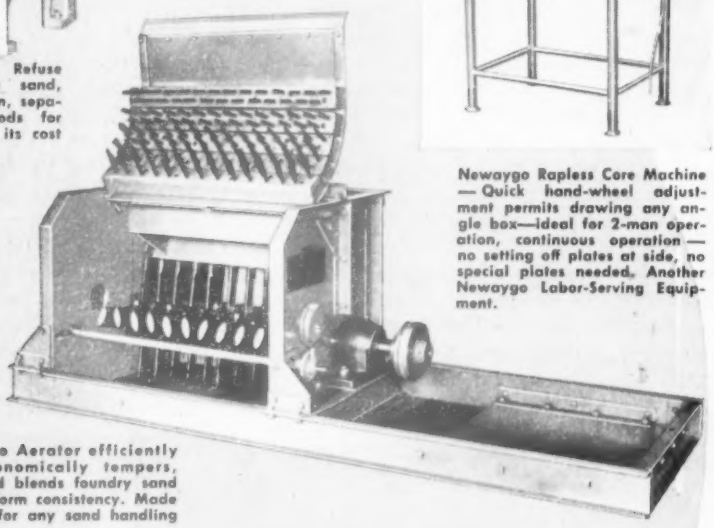
Newaygo Mill cuts costs for large users of sand. Salvages sand lumps from screens, separates non-magnetic tramp material and metal which escapes magnetic separator. All lumps reduced to proper grain size. Provision for eliminating float dust. For systems up to 120 tons per hr. for shake-out sand.

Newaygo Foundry Turntable —Standard sizes 8' to 24'. Segmental construction. Interchangeable gear sections. Variable speed drive. Underpan with plows handles spillage through grates.



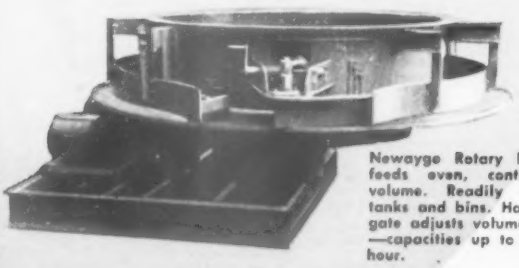


Newaygo Core and Refuse Crusher recovers core sand, slag for iron reclamation, separates gaggers and rods for re-use. Quickly returns its cost in salvaged core sand.

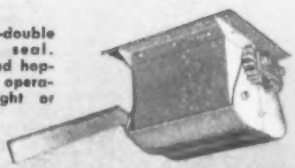


Newaygo Rapless Core Machine — Quick hand-wheel adjustment permits drawing any angle box—ideal for 2-man operation, continuous operation — no setting off plates at side, no special plates needed. Another Newaygo Labor-Serving Equipment.

Newaygo Aerator efficiently and economically tempers, cools and blends foundry sand to a uniform consistency. Made in sizes for any sand handling system.



Newaygo Rotary Plate Feeder feeds even, controlled sand volume. Readily attaches to tanks and bins. Hand crank on gate adjusts volume. Two sizes —capacities up to 75 tons per hour.



Newaygo Sand Gates—double undercut type. Tight seal. Available for all bins and hoppers. Geared for easy operation. Hand, counterweight or air operated.

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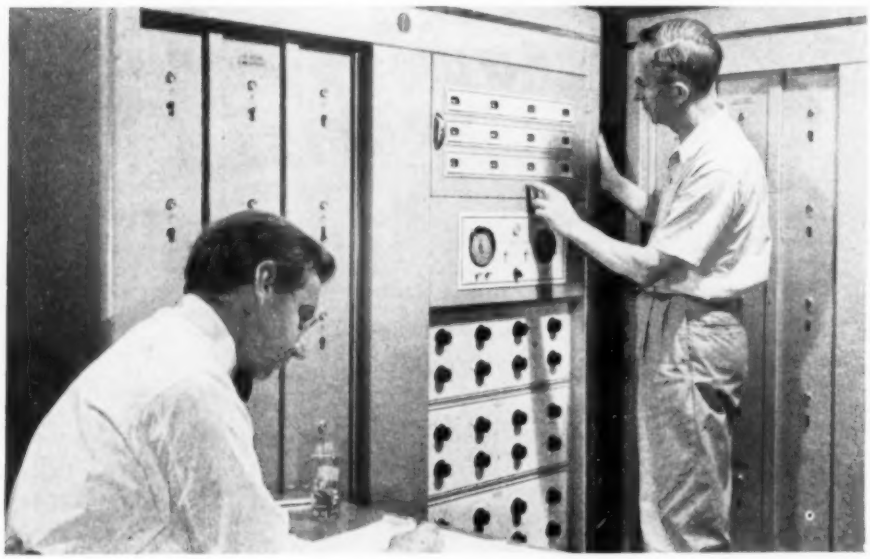

RECENTLY Apex Smelting Co., Cleveland plant, installed one of the largest direct-reading instruments for the spectrochemical analysis of aluminum alloys. The instrument, called the Quantometer and made by Applied Research Laboratories, Glendale, Calif., consists of three units: A special spectrometer containing 20 light receivers, two recording consoles with a recorder for each receiver, and a power unit for excitation of high-intensity spectrums of samples to be analyzed.

Complete analyses of samples are obtained in less than 5 minutes for each, and the instrument is principally employed to control alloy composition during melting and refining operations in the production of aluminum ingot. In conjunction with a pneumatic tube system for transporting samples from the furnaces, and a telautograph for forwarding laboratory results to those in charge of the furnaces, the necessary adjustments are made in the furnace bath to meet predetermined alloy composition specifications.

Instead of using photographic film for reception of the spectrum of the specimen being analyzed as in the case of the spectrograph, the Quantometer employs multiplier phototubes. Each tube or receiver is arranged so that it receives light from a single spectrum line of each of the elements to be determined. One of the tubes is adjusted to receive the light from the aluminum line and is employed as the internal control of the instrument. Integrated intensity of the spectrum line, on which the receiver or tube is focused, is measured on a recorder, and the total time of recording is controlled by the receiver obtaining light from the aluminum standard line. Printed tapes on each recorder give direct readings of percentage composition. Printed tapes are developed from data obtained on standard samples.

Due to the necessity of maintaining constant atmospheric conditions, the instrument is located in an air-conditioned room where temperature and humidity are held within the desired limits. Accompanying illustrations show the recording console with its various controls above, and the spectrometer unit is depicted below. All spectrochemical analyses are conducted under the direction of Dr. K. B. Thomson head of the spectrographic laboratories, and his assistant, Dr. H. C. Robinson.

Book Review

Electric Traction for Cranes, by Richard A. West, cloth, 86 pages, 5½ x 8½ in., published by Pitman Publishing Corp., 2 West 45th St., New York 19. Price $3.50.

Dealing mainly with the requirements of the long travel motion of the steel-mill crane bridge, the book makes occasional reference to the other auxiliary motions where appropriate and also to other types of cranes. It shows how the best use can be made of one of the main features of the series motor—the considerable rise in speed with decreasing load. The author has attempted to bring together the necessary mechanical and electrical particulars so that the book will be useful to engineers in either field in making suitable recommendations of horsepower and geared speed.

Management Course

College of Engineering, University of Iowa, Iowa City, Iowa, is offering its tenth management course from June 7 to 19. The course is designed primarily for people from industry who want comprehensive training in production planning, job evaluation, motion and time study, wage incentives, plant layout, and related subjects. It combines fundamental training with practical applications.

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INFLUENCE OF VACUUM

On the Malleabilizing Process

RECOGNIZING that excessive amounts of entrapped or absorbed gases have been held responsible for a variety of defects in steel, considerable speculation has existed as to the possible effects of small amounts of absorbed gases. To determine what, if any, effects were produced by gas absorption during the usual operations of heat treatment, the Committee on Industrial and Commercial Gas Research of the American Gas Association sponsored a research program on vacuum heat treating at Surface Combustion Corp., Toledo, O. Report of the results obtained are described in detail in "Research in Controlled Vacuum Heat Treating," by Jack Huebler from which the following relating to the work on malleable iron is extracted.

Of the experiments which have been conducted, probably the most interesting are the malleablizing tests. It is well known that the atmosphere surrounding malleable iron during its anneal has a profound effect upon the resulting iron. The object of the experiments to be described is to find how the malleablizing reactions progress when no atmosphere and no dissolved gases are present and at the same time to determine the effect of various types of atmospheres.

To be assured of as uniform results as possible, a set of unannealed malleable test bars was obtained, all poured from a single heat. Chemical analysis of this iron showed 2.54 per cent C, 1.26 per cent Si, and 0.47 per cent Mn. Proper anneal of this iron under the conventional treatment develops 53,000 to 54,000 psi tensile strength and 12 to 19 per cent elongation. Anneals were conducted in vacuum, in DX gas (5 per cent CO_2, 10 per cent CO, 12 per cent H_2, 3 per cent H_2O and 70 per cent N_2); in RX gas (20 per cent CO, 40 per cent H_2, and 40 per cent N_2), in cracked ammonia (75 per cent H_2 and 25 per cent N_2) and in substantially pure nitrogen (96 per cent N_2, 2 per cent H_2 and 2 per cent CO) using the normal cycle, a cycle requiring about three-quarters the time, and a cycle requiring about one-half the time.

The exact cycles are shown in Table I, and the physical properties developed by the various anneals are shown in Table II.

From these data some important generalizations may be drawn. It will be observed that Table II is arranged so that the hydrogen content of the atmosphere increases from top to bottom and that the annealing time decreases from left to right. From the table it is immediately apparent that the completeness of anneal decreases rapidly with high hydrogen content of the atmosphere as in RX gas and in cracked ammonia. It is also apparent that malleablizing in a vacuum gives a more complete anneal than when using the low hydrogen DX and nitrogen atmospheres, although here the difference is rather slight. An explanation of this phenomenon must depend upon dissolved hydrogen and possibly, to a lesser extent, upon dissolved nitrogen acting to slow down the dissociation of cementite into graphite. Since the hydrogen content of the atmosphere determines the hydrogen content of the steel, the results bear out this theory in all the experimental work.

Accelerated annealing cycles were used to emphasize the effect of the atmosphere and to find the shortest possible cycle under vacuum. In vacuum, repeated tests using the 12-hour cycle (this is one-half the normal cycle) gave elongations from 13 to 14 per cent and microstructures substantially free of pearlite. Repeated tests with DX gas gave a much greater spread of results, the elongation going from 9 to 15 per cent and the microstructure always showing an appreciable amount of pearlite. In general the microstructures are in agreement with the physical data.

Develop Pearlitic Rim

An effect of the atmosphere, which does not reflect itself in the physical properties, occurs at the edge of the samples. Micrographs show that only when the samples are malleablized in vacuum or in nitrogen is the resulting structure uniform out to the edge of the piece. When the remaining gaseous atmospheres were used there invariably resulted a pearlitic rim, with or without an additional ferritic rim. When the atmosphere was decarburizing, as it was with DX gas, cracked ammonia, and in one case with DX gas, the outer rim consisted of ferrite followed by a pearlitic rim. When the atmosphere was carburizing only the pearlitic rim resulted. In either case these rims are to be avoided since the pearlite is too hard and the ferrite too soft for good machinability.

The pearlitic rim, which occurs when a carburizing gas is used is simply a carburized case. The formation of the pearlitic rim inside of the ferritic rim when a decarburizing atmosphere is used is more complex. This rim is possibly formed by decarburization lowering the carbon content enough to prevent first stage malleablization (high temperature) in the affected part of the sample. Consequently, second stage malleablization would be greatly inhibited due to the absence of graphite nuclei in that zone. Thus a pearlitic area will result.

The work which has been done shows that vacuum malleablizing gives superior results from the standpoint of consistency, speed, and the elimination of rims. However, the low cost of malleable iron makes it difficult to visualize a vacuum furnace competing with the present type of equipment. Based upon these results one must also conclude that high hydrogen atmospheres are to be avoided in malleablizing.

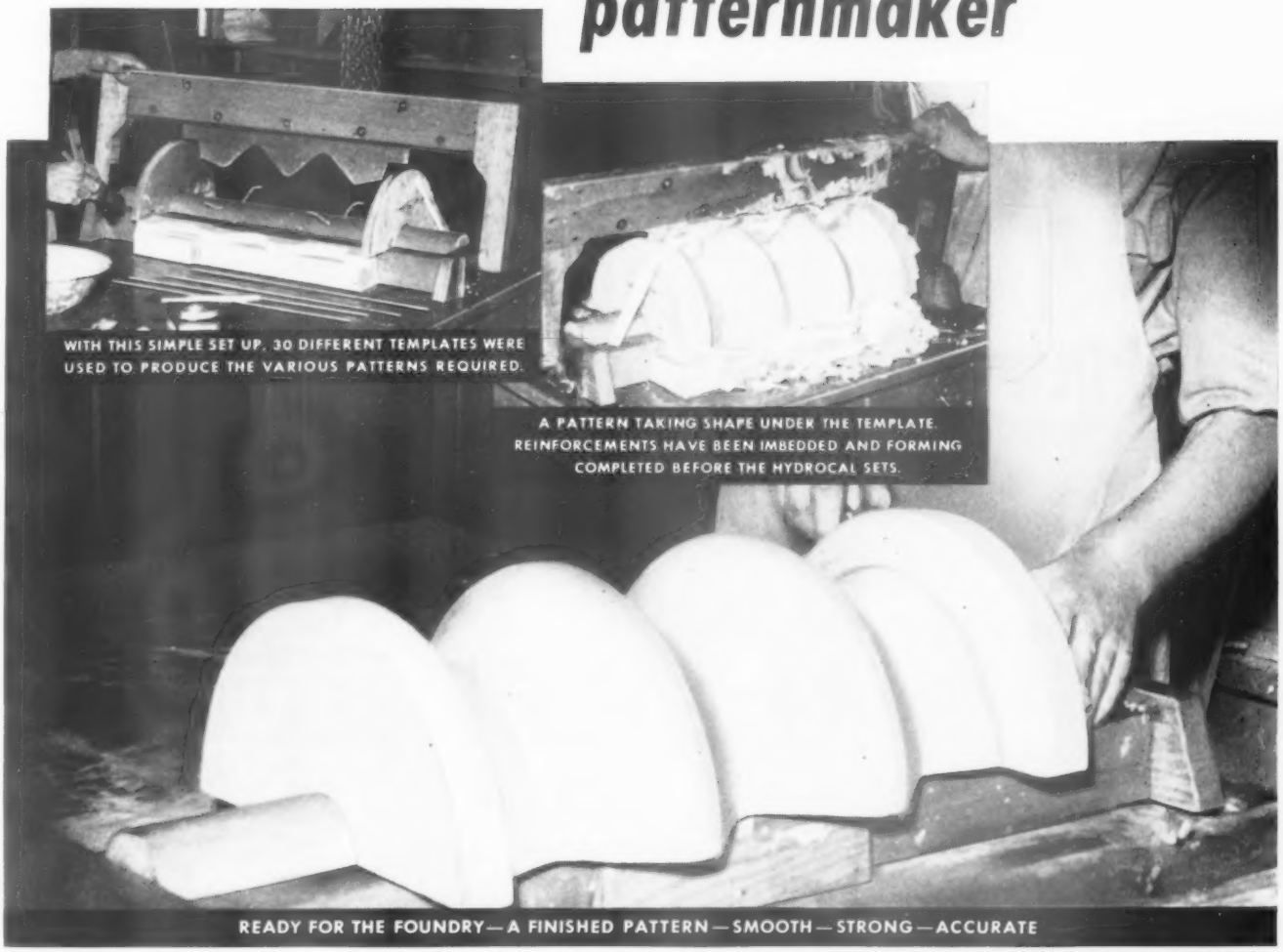
TABLE I—Annealing Cycles Employed

Normal Cycle	⅝ Cycle	½ Cycle
Rapid heat to 1575° F	Rapid heat to 1575° F	Rapid heat to 1575° F
Heat 1575 to 1750 in 5 hr	Heat 1575 to 1750 in 3¾ hr	Heat 1575 to 1750 in 2½ hr
Hold at 1750 for 7 hrs.	Hold at 1750 for 5¼ hr	Hold at 1750 for 3½ hr
Furnace cool to 1400	Furnace cool to 1400	Furnace cool to 1400
Cool 1400 to 1300 in 12 hr	Cool 1400 to 1300 in 8 hr	Cool 1400 to 1300 in 6 hr
Total time = 26 hr	Total time = 18 hr	Total time = 12 hr

TABLE II—Physical Properties Developed by Various Anneals

Atmosphere	24 Hr Cycle	18 Hr Cycle	12 Hr Cycle
Vacuum			
Tensile in psi	50,500	53,300	50,500
Elong. in %	16	15	13.5
Nitrogen			
Tensile in psi	.....	51,600	54,000
Elong. in %	.....	13.5	12
DX Gas			
Tensile in psi	54,400	56,000	58,000
Elong. in %	16.5	14	12.5
RX Gas			
Tensile in psi	54,700	60,200	62,600
Elong. in %	12.5	7	6
Cracked NH_3			
Tensile in psi	60,700	.....	.....
Elong. in %	10	.....	.....

How HYDROCAL* helped a Pennsylvania patternmaker



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WEAR RESISTANCE OF GRAY IRON DIESEL ENGINE LINERS

(*Continued from page* 139)

company for many years as being correct for liner wear. However, there are advocates of the use of a hardened liner, hence one test was made on liners having the following analysis and hardness: TC 3.00-3.20 per cent, Si 1.15-1.35 per cent, Mn 0.90-1.10 per cent, P 0.20 per cent max, S 0.12 per cent max. The liners made to this analysis were oil-quenched and tempered to a 415 brinell hardness.

We therefore had seven different and distinct analyses, one of which was hardened, for wear testing. The quantities of the alloys used were arbitrarily established. No attempt was made to investigate the effect of different amounts of alloy additions on the wear rate.

The microstructures of the various compositions are shown in Figs. 4 to 15, inclusive. Typical analyses and physical properties are listed along with the various microstructures.

It will be noted that the graphite formation obtained in all these compositions was Type *A*. Visual examination of the specimen covering larger areas than shown in the photomicrographs showed that no Type *D* graphite was present. As all these liners were made by the Meehanite process in which ladle inoculation with controlled melting is the standard practice, the correct graphite formation was insured.

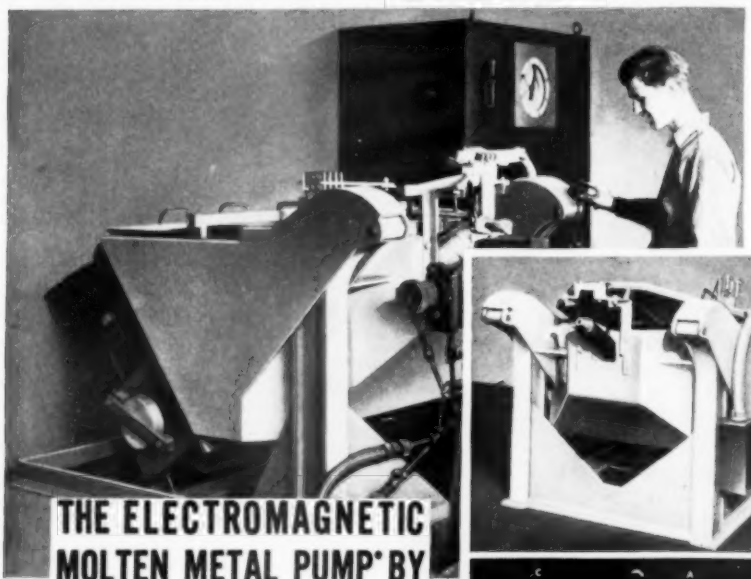
The matrix structure in all cases, with the exception of Composition *F* was pearlitic. Composition *F* shows some secondary ferrite. The high phosphorus liners showed a considerable amount of steadite which would be expected. These same liners showed a tendency toward microshrinkage. In the case of the high silicon-chrominum liners, there was a considerable amount of a white constitutent which at first was believed to be carbides. However, with silicon as high as this, it was felt that it would be quite improbable that carbides would be present in such a large amount even in the presence of chromium. Etching with sodium picrate showed (Fig. 16) that they were not truly carbides, but rather an eutectic of some sort. We have not as yet identified them exactly.

The average wear results and other pertinent information obtained on this test is given in Table I. It will be noted that there is a wide divergence in the wear results obtained. These compositions will be discussed separately.

Composition A—This composition shows the highest wear rate. It was an entirely unsatisfactory liner iron. We are fully aware that analogous compositions have been used successfully. Our experience with it was peculiar in that we would find liners that gave excellent wear and others that gave extremely poor results. Investigation of the reason for this revealed that the liners which gave good wear contained small amounts of chromium or molybdenum in amounts never over 0.35 per cent They were residual alloys picked up from the scrap or returns used in melting.

The microstructure of the copper bearing irons was Type *A* graphite, with a pearlite matrix claimed as necessary for good wear resistance. However, in etching this type of iron for microscopic study it was observed that there is a ghost-like structure which has the appearance of a broad band around the old austenite grain boundaries. It does not appear in the

A New NON MECHANICAL METHOD FOR CONTROLLED PUMPING OF MOLTEN METAL

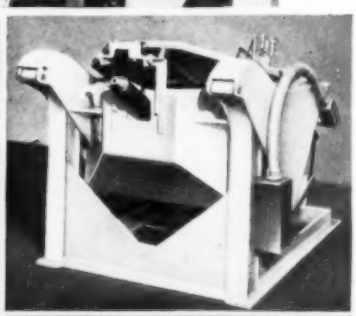


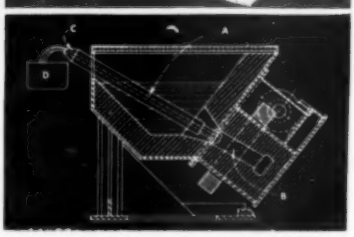
THE ELECTROMAGNETIC MOLTEN METAL PUMP* BY AJAX

Here is a device for the precise control of the flow of molten metals like aluminum, zinc or brass. It can be used to mechanize operations where today a hand ladle, a tapping spout, a tilting equipment or a siphon is used.

The electromagnetic pressure created by the high current in the loop of an Ajax Twin Coil Induction Unit is utilized to control and channel the metal stream in one direction; it lifts pure metal from the bottom of the hearth through an electrically heated refractory pipe over the metal level to its destination. The electric current alone controls the flow.

Castings ranging from ¼ lb. to 30 lbs. or more can be poured in endless repetition with good accuracy in weight. Special problems requiring a continuous flow of hundreds of pounds per minute can be handled by the same unit. The electromagnetic pump is also a molten metal reservoir maintaining metal temperature accurately.





The large photo shows the Ajax Tama Electro-magnetic Pump at work. Control cubicle in rear maintains temperature, energizes pump from electric timer, electric eye, or similar devices. Second photo is a close-up of the pumping unit. Below is a cross section of unit showing discharge pipe (A), induction channel where pressure is created (B), pouring spout (C), and mold (D).

Ask AJAX for more information.

*Patents applied for and allowed.

AJAX ENGINEERING CORPORATION
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AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

irons that give good wear. Actually this band would etch lighter than the center. It is so hazy that we have never been able to photograph it. We were unsuccessful in our attempts to definitely establish the cause of this phenomenon. We believe, however, that there is a concentration of copper in these light areas giving what amounts to a cored structure as far as the copper distribution is concerned.

Our experience with the use of copper bearing liners has been profound. Besides the 28 liners shown in the table, we have had sufficient information on many more that have given poor wear, but we could not use the information in the table because of the lack of correct measurements.

Composition B—This composition is a high-phosphorus iron. The wear experienced with it is comparable to the other compositions. It is a fairly good wearing iron.

Most foundrymen know, of course, that cast iron with phosphorus as high as indicated will shrink more than a lower phosphorus iron when cast into sections that are fairly heavy. This has been our experience in making liners made out of this composition. Rejections due to this shrinkage precludes its use.

Composition C—This composition is a standard one used by many engine builders for liners. The alloying with nickel, chromium, and molybdenum refines the pearlitic grains which gives good wear results. From the foundry standpoint this is an excellent iron to handle.

Although the table shows that only four liners were tested, subsequent experience on a number of others, the results of which could not be used, shows it to be an excellent wearing material. It is the standard analysis now being used by the author's company for diesel engine liners.

Compositions D and E—These two compositions can be grouped as they both have silicon and chromium, the only variant being the amounts of these two alloys. They are very good wearing irons. The reason that Composition *E* shows better wear than Composition *D* is believed to be in the number of liners used for test.

From the standpoint of the foundry, both these compositions are difficult to handle. To add 4.00-5.00 per cent Si and 2.00 per cent Cr to the ladle is not easy. However, it is possible to add 3.50 per cent Si and 1.00 per cent Cr satisfactorily. Composition *E* has been made by the author's company in the cupola without seriously disrupting its operation in producing other grades of gray iron.

These compositions will shrink very, very seriously. In fact, it is almost impossible to cast them statically without shrinkage. However, where the design of the liner is such that they can be centrifugally cast, solid ones can be produced.

Another serious complaint about these compositions is that they are extremely brittle. If one of them is dropped or is even tipped over, there is danger of it cracking or breaking. This offers serious objection to their use. These liners may be broken or cracked either in shipment or in installation even if they were carefully handled in the shop during machining. Such things as this are serious limitations to their use.

Composition F—This composition is a high-carbon, molybdenum type of cast iron. The wearing qualities may be considered rather poor, being over twice as much as the other good wearing compositions.

The explanation of this greater wear rate can be found in the micro-

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structure shown in Fig. 15. It will be seen that this composition has a considerable amount of secondary ferrite in the matrix. The silicon content of this composition is very high, giving a maximum carbon equivalent of 4.07. This may be the reason we got the secondary ferrite. This is pointed out because we do not wish to condemn molybdenum additions to wear resisting castings. By properly balancing the silicon with the carbon and molybdenum a pearlitic matrix can be produced. It is believed, however, that it does demonstrate that secondary ferrite in the matrix, even if Type *A* graphite is present, will induce poor wear resistance.

Composition G—This is an unalloyed gray iron which has been hardened to over 400 brinell by oil quenching and tempering. Although only two liners were tested, the wear results were extremely good. This confirms the reason why certain manufacturers of the smaller sizes of diesel engines induction harden their liners.

Quench hardening of large liners offers a considerable amount of difficulty and expense. The distortion obtained in quench hardening makes honing difficult. Induction hardening reduces the distortion; however, the expense involved to install the equipment for large diameter liners is prohibitively high. Thus it is not an economical thing to use hardened liners in large diesel engines unless considerably higher wear resistance is accomplished. In general a 2-1 ratio is not sufficient to justify this expense.

The experience presented here confirms in general the fact that Type *A* graphite with a truly pearlitic structure gives the best wear resistance. The use of ladle inoculants to produce this structure is advisable.

Select Proper Alloys

Care should be exercised in the choice of alloys used in wear resisting gray irons. The use of copper as a single alloy seems to be detrimental to wear resistance; however, copper with either chromium or molybdenum with a balanced carbon-silicon ratio so as to produce a pearlitic structure, seems to give good wear results. The extremely high silicon irons with the proper amount of chromium so as to give a pearlitic structure are good wear resisters. However, they are extremely brittle. Phosphorus additions of 0.35-0.50 per cent improve wear resistance, but also tend to cause excessive porosity in fairly heavy sections.

From the evidence obtained in these tests, the most all-around satisfactory iron, as far as wear resistance is concerned in the machinable classes, seems to be one which has a pearlitic structure and Type *A* graphite, alloyed with 1.00-1.50 per cent Ni, 0.30-0.40 per cent Cr, 0.25-0.35 per cent Mo.

From the evidence given, the physical properties, other than that they must be high enough to stand the stresses imposed on the liner, are immaterial. In the machinable classes of iron the brinell hardness, because it indicates to some extent the microstructure of the iron, is of importance. In this type of iron the following specification would be used: "The iron used shall have Type *A* graphite with a pearlitic structure containing no free ferrite and a brinell hardness of over 190."

Hardened gray iron apparently gives better wear resistance. A hardness of over 400 brinell seems to be correct. However, as stated before, the hardnening of large diesel liners

(*Concluded on page* 312)

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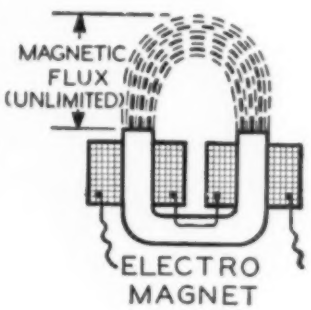

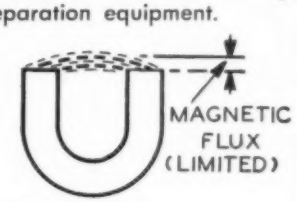

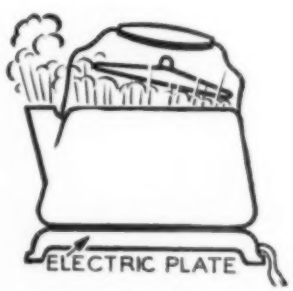

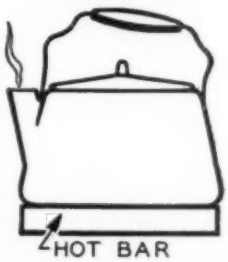

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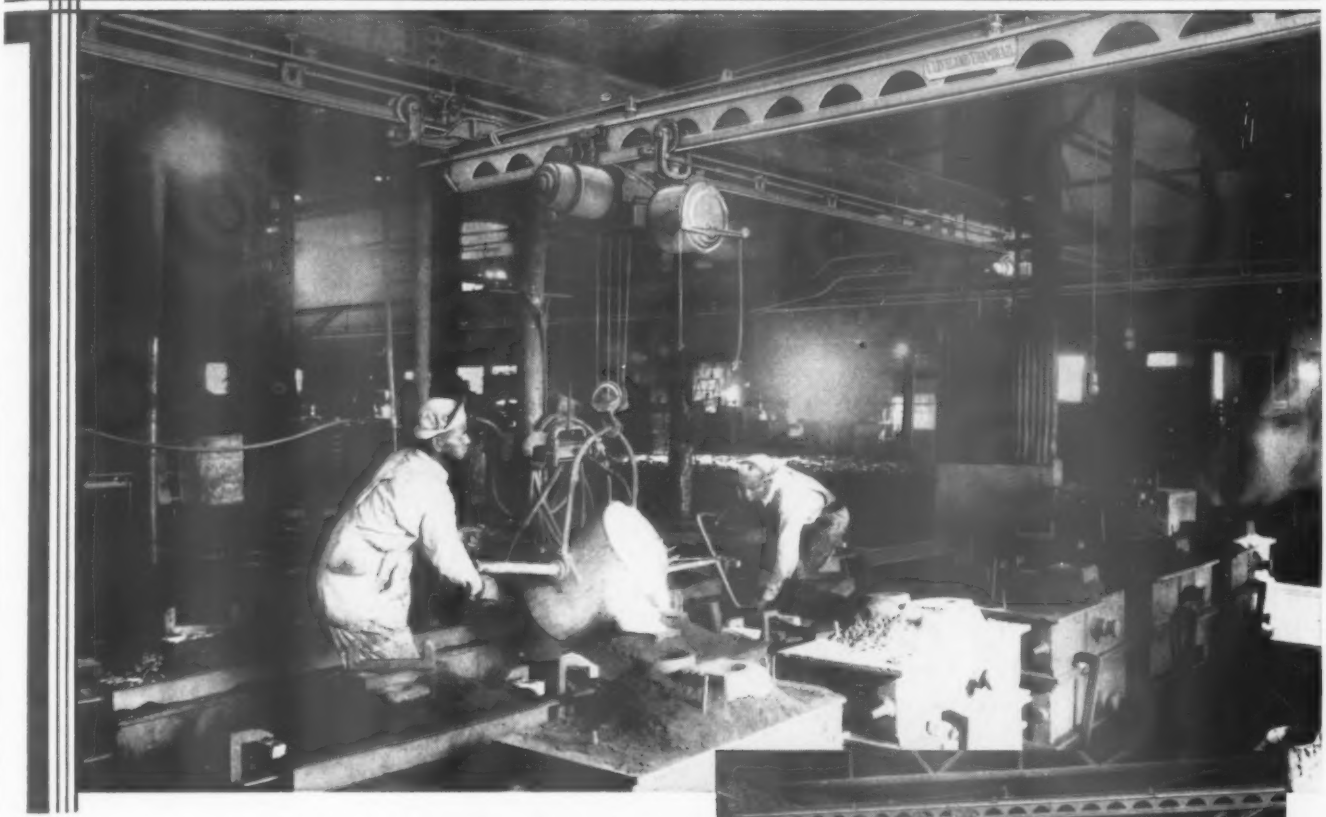

Texas Foundry Revolutionized with CLEVELAND TRAMRAIL

Before the advent of Cleveland Tramrail the Trinity Valley Iron and Steel Company, a gray iron jobbing foundry in Ft. Worth, Texas, was limited to the production of small castings because their flasks, molds, cores and ladles could be no larger or heavier than readily handled by hand, except in the main bay of the shop.

Practically overnight this concern was revolutionized by installation of a Cleveland Tramrail system. It took them out of the small casting class; they now can pour castings of any size, from the smallest to the largest. It cut drastically the time required for handling materials and thereby boosted efficiency greatly. It reduced metal heat loss because conveying time from cupola to mold is less via the Tramrail route. Safety has been aided.

The Cleveland Tramrail system at Trinity Foundry consists of many bridges, hoist carriers, switches and extensive trackage which provides overhead handling service for nearly the entire floor area.

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CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

(*Concluded from page* 310)

is too expensive to be practical.

It has been shown here that metallurgy has an important role in the wear resistance of gray iron liners. Other factors previously stated also influence the amount of wear experienced. Perhaps the most important factor is the design of the engine.

The influence of design has been given considerable study by the author's company. It was found that the greatest improvement in wear resistance, provided that the metallurgical considerations were of the best, was accomplished by design. Only one example can be given. By oil cooling the pistons, and thus removing the heat around the rings, on the otherwise same design of engine used for this test, the wear obtained was approximately one-fourth to one-half shown that in Table I. Many other design factors influencing wear are covered in many articles on this subject. It is not the purpose of this article to enter into a lengthy discussion of them. It is unfortunate that so many of these articles completely neglect the metallurgical aspect of the problem; thus, there is a chance that false conclusions were drawn.

Finally, no claim is implied that this information presented is the final word on the metallurgical aspects of wear. The problem is too complex to cover completely in service wear tests. The results presented have been substantially proved by actual wear experience on many, many engines which have been produced in the past eight years, which represents the time during which these tests were conducted. Of course no actual figures are available. However, engine builders soon learn of serious wear conditions, and thus it is possible to make a rather complete check on the controlled tests.

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2. E. K. Smith, "Cast Iron Cylinder Bores—Observations on Microstructure, Composition, Hardness and Wear," AFA *Transactions*, Vol. 48, No. 4, June, 1944, pp 667-722.
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Book Review

America's Needs and Resources by J. Frederic Dewhurst & Associates, 812 pages, published by the Twentieth Century Fund, New York, price $5.

The survey reported in this book is one of the most complete ever made and represents past accomplishments and estimates future output and needs in virtually every part of our entire economic system. The text deals extensively with basic trends, such as production, population, income, expenditures and savings; consumer requirements in clothing, housing, transportation, medical care, and recreation; capital requirements for productive facilities, urban developments and rural and regional developments; government costs and foreign transactions; resources of labor, agricultural and natural; and a general summary of needs and resources.

Much attention is given to the place of the machine in increasing productivity and the standard of living. It is estimated that if this nation can increase output per man-hour at the average rate of the two decades before the war, which seems quite possible, the industrial machines could turn out a gross product of nearly $200 billion in 1950. On the same basis it is estimated that the total output in 1960 would approach $249 billion.

A great amount of statistical information is presented in this book.

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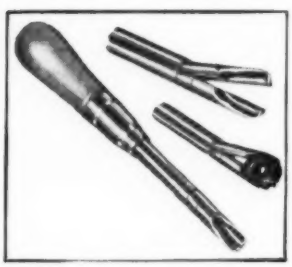

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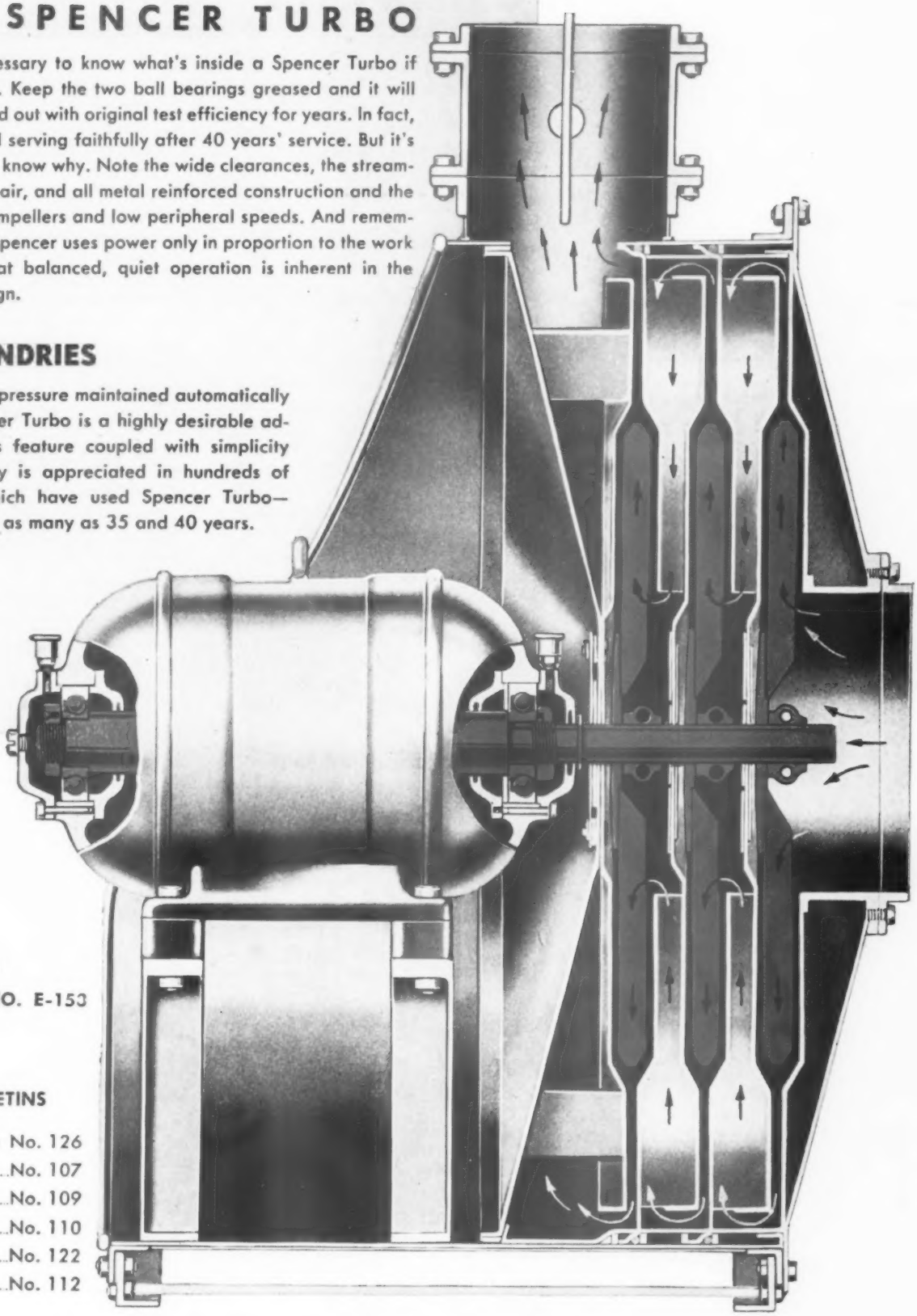

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READERS' COMMENT • • •

Internal Riser Successful

TO THE EDITORS:

I read your article on "Internal Risers" in the February issue of THE FOUNDRY and found same very interesting. In fact, at the time we were having riser trouble with some "All Bell Water Works Tees" we were making in flasks that were too small for the job; therefore we had to place our risers on the bells of the castings which gave us no end of trouble to break off.

After reading your article on "Internal Risers" on gates we decided to give this idea a good trial. Our copes

were only 5 inches high so we were handicapped in the height of the risers. We also had trouble hitting the hidden risers with the rammer, so we tried cutting the risers with a tubular sprue cutter. This was slow and gave us loose sand in places.

We were satisfied that the internal riser was a good idea, therefore we had to do something to meet our local condition, and this is what we did.

We rammed our wooden sprue sticks set halfway between the casting and the sprues and in line with our feed gates on each side of each sprue. This gave us four open risers, so over each riser hole we placed a piece of core cake about half an inch thick and about twice the diameter of the hole. We then covered the core cake with about 3 inches of sand packed down tight. We then built our sprue up about 3 inches, and there we made an internal riser from an open riser. We found that we could use any size we desired and did not have to worry about breaking the casting when we knocked off our risers. The results were very satisfactory. Thanks for the article.

We are enclosing a snapshot of the casting showing casting, sprues, gates and what we call internal risers. What do you think of our idea of making an internal riser in a shallow cope?

CHAS. H. WINTERBORNE
W. H. Winterborne & Sons
San Antonio, Tex.

• • •

Develops Core Mixture

TO THE EDITORS:

During the past year I have found the information which I gathered on a tour of the United States several years ago of great assistance in enabling us to increase our production of bucks for pressing machines. Local foundries had some trouble with the cores until we developed the following core mixture: ½-tin silica sand; ½-pint core gum; ½-pint linseed oil; ¼-pint water. The cores are baked for 2½ hours at 325° F. (The familiar oil can used for a wide variety of purposes in the Far East is 9¼ x 9¼ x 13¾ in. Capacity about 68 lb sand. Ed.)

I had a new corebox made as recommended by you in a letter some years ago, in which you advised hinging the two parts together. This has enabled us to cut down coremaking time by more than one-half. Although I had to wait a long time before I could put some of your information to work, it has paid off in the long run. Some day we may build a foundry of our own, but just at present, building costs are so high and materials so hard to obtain, we are not considering extension at present.

ARTHUR W. BROWN
New Zealand Textile Engineers Ltd.,
112 Jackson St., Petone, New Zealand

• • •

Chamotte Is Being Used

TO THE EDITORS:

In the January issue on page 101 under the heading "Roast Clay To Form Chamotte", it is stated that chamotte is not used on this side of the Atlantic. However, at least two steel foundries in this country are using the so-called chamotte process for the production of a certain proportion of their castings. Chamotte is dehydrated, sintered, good quality fireclay which is broken up, ground and screened to suitable grain sizes. To that material is added the desired ratio of green fireclay and water in a mulling operation, resulting in a workable mixture for use as a facing next to the pattern in making molds to the depth of from ½ to 1½ in., backed by heap sand which may or may not contain more or less reclaimed sand containing chamotte.

The so-called compo process used in England is similar in nature except that the base material is old, reclaimed fireclay brick salvaged from furnace linings. Those are ground, screened to suitable sizes and mixed with green fireclay to provide the facing material.

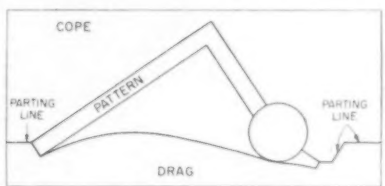
J. RICHARD ADAMS
192 *West Greenwood Ave.*
Lansdowne, Pa.

• • •

How To Train Apprentices

TO THE EDITORS:

In the February issue of THE FOUNDRY, I read an article on apprentice patternmaking. Illustrations showed some of the patterns. Why could not the casting have been made by tipping the pattern as shown in the accompanying sketch. The way the work would have been done by any practical molder. Or is it that job shops do not care to make good patterns cheap, or do not know how?



For a one-off job this pattern would be set in a false cope and rolled over. If more than one casting, the cope could be used as sand match.

Under proper conditions and under a competent teacher, a young man can be developed into a skilled patternmaker, wood or metal, in two years. The teacher should be a real patternmaker, old enough, honest and hard boiled to know what is going on. By attending strictly to his teaching he can get out of all the routine hard work. In other words the man must be lazy enough to let a boy do his work and raise hell if he has to do any more work than necessary. I have tried it out and have developed boys into passable patternmakers in two years.

EARL HOLMES
Fort Wayne, Ind.

Editor's Note: Mr. Holmes is unduly critical. The article on apprentice patternmaking by Frank Cech in the

February issue of THE FOUNDRY, was simply a description of the different methods the boys used to make patterns for the apprentice contest staged every year at the annual convention of the AFA.

* * *

Not Meehanite Producer

TO THE EDITORS:

Just as a matter of interest I would like to call your attention to the fact that in the article by I. Forsland, Chief metallurgist, S.K.F., Sweden, the author makes an erroneous statement. When referring to his foundry output he states: "This metal is partly cylinder cast iron and partly Meehanite."

I am sure you will be interested to know that this company is not a producer of Meehanite castings and I am at a loss to understand Mr. Forsland's statement. In the first place, no Meehanite foundry anywhere in the world divides their production between "cylinder cast iron and Meehanite metal." All such foundries, utilizing the Meehanite processes, equipment and techniques, produce only Meehanite castings.

C. E. HERINGTON
Manager
Meehanite Metal Corp.
New Rochelle, N. Y.

* * *

Praises Tribute To Foundry

TO THE EDITORS:

"I Love the Foundry," by Mr. Lincoln Piotrowski under Reader's Comment on page 216 February '48 issue, THE FOUNDRY, is the finest tribute to the foundry that I have ever read.

I would suggest that this letter be presented to the boys of America by the American Foundrymen's Association and all the foundry societies.

SAMUEL R. ROBINSON
Euclid, O.

* * *

Storing Aluminum Matchplates

TO THE EDITORS:

A request for information on storing aluminum matchplates appeared in a recent issue of THE FOUNDRY. We have about 700 wood and aluminum matchplates that cannot be stored in contact with each other. We have developed a pigeon-hole system for storage as shown in the accompanying illustrations. Any available wall space can be utilized in this manner where patterns must be stored by number and not by size.

Patterns in current use are hung on a frame on one of three benches. Patterns for incoming work that goes on the floor the following day are hung on No. 1 bench. One side of bench No. 2 is for patterns that have been in the foundry, but have not been checked as to whether the run is complete. The other side of No. 2 bench is for patterns where the run has been completed. They are checked and placed on bench No. 3 where the pattern runner places them in the current, or permanent storage, until a subsequent customer order brings them back into service.

One important advantage of the method is that the patterns are not in the pattern shop for repairs before the next job can be started. This item alone can amount to quite an increase in operating expense over a yearly period.

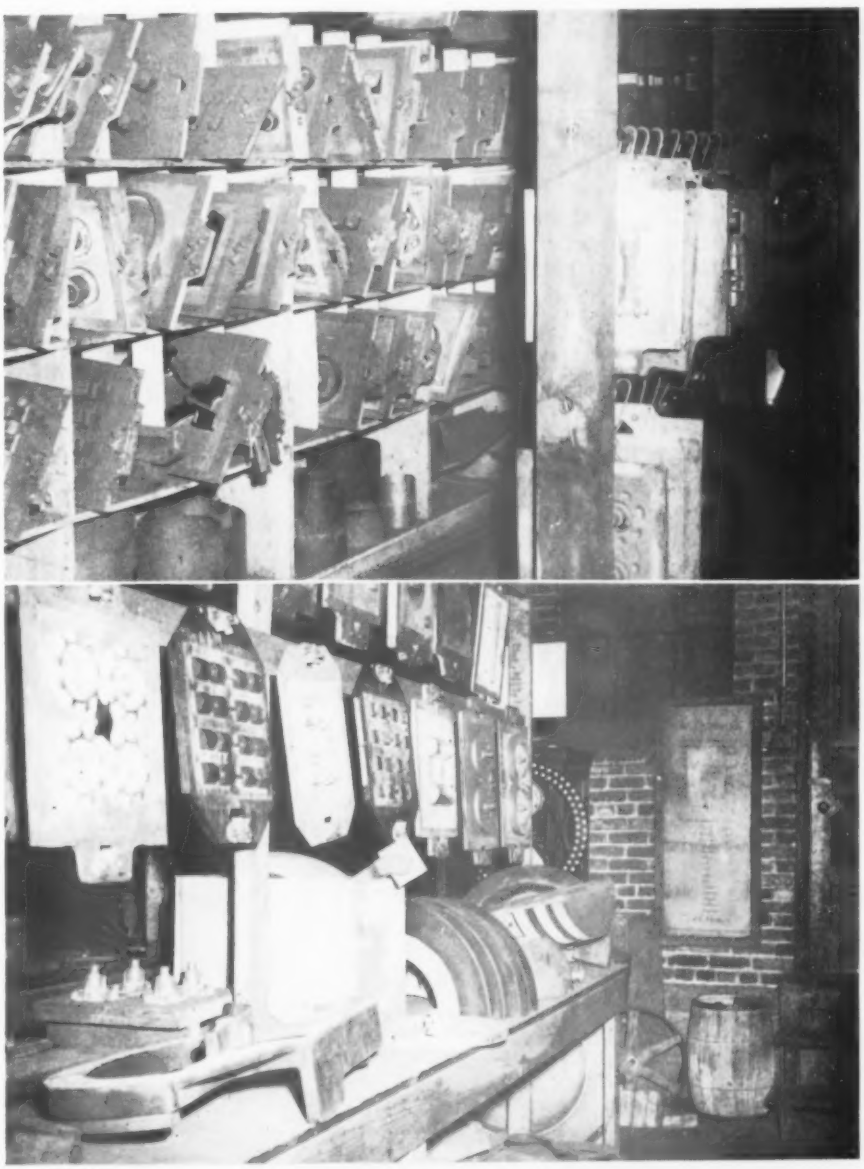
H. E. BLACK
Washington Machinery & Supply Co.
W. 9 Cataldo Ave.
Spokane 11, Wash.

Side-Blow Converter Practice

TO THE EDITORS:

A paper presented before the 1944 meeting of the British Iron and Steel Institute on side blown converter practice, entitled "Developments in the Design and Use of Side-Blown Converter Plants," by P. C. Fassotte, apparently has received very little attention in this country. This paper presented a new development that, in the writer's opinion, should interest anyone who deals with steel production. Specifically it shows how hot steel can be made by the converter process without the use of silicon in the primary molten cast iron. This is brought about by superheating the molten cupola iron in an intermediate rotary furnace fired with powdered anthracite coal.

An all-steel scrap charge is melted in a cupola with a deep coke bed to obtain a high pickup of total car-



Pigeon-hole system for storing wood and aluminum matchplates

bon in the molten cupola iron. This molten iron, containing from 0.05 to 0.2 per cent Si with a temperature of 2336 to 2580° F after desulphurization, is heated to a temperature of 2642° F in the rotary furnace before being transferred to the side blow converter. Molten steel at a tapping temperature of 3002° F is readily produced. The blowing time is materially shortened. When blowing such low Si iron a high lining loss was to be expected, and this was offset by adding fine-grain silica sand to the molten iron in the converter just before starting the blow. This resulted in an increase of 100 per cent in the life of the converter lining compared to former practice. The percentage of blowing loss was reduced from 9 per cent by regular practice to 5 to 6 per cent by this new practice. This new practice has shown that silicon is not needed in the converter process, provided the initial temperature of the molten iron is sufficiently high. In other words, it demonstrated that silicon is a kindling agent only.

A further difference between British and American practice lies in the treatment of the converter slag. In Britain this slag is skimmed off at the end of the blow and the final additions made—this results in a decided saving in manganese.

In order to check two points covered by this modified practice, the writer made the following changes in operating procedure (using regular silicon—1.5 per cent in the molten cupola iron): (1) Adding ½-lb fine-grain silica sand to each 100 lb of iron on top of the iron charge in the converter just before starting the blow. This resulted in doubling the life of the lining. A word of caution is in order here as too much silica sand will "choke" the blow causing a much delayed "light." (2) Skimming off approximately three-fourths of the slag into the pit at the end of the blow. This reduced the loss of manganese from a former percentage of 40 per cent to a loss of only 10 per cent by this practice.

From the foregoing the following standard practice was adopted by the writer: (1) After adding molten cupola iron to converter, add ½-lb dry fine-grain silica sand per 100 lb of metal. (2) After completion of blow, skim slag almost completely from steel, plunge wet 15 per cent silicon pig to add 0.15 per cent Si, and wet 80 per cent ferromanganese to add 0.70 to 0.90 per cent Mn (allow 10 per cent loss in Mn.). (3) Tap into heated ladle adding 0.20 per cent Si as 50 per cent ferrosilicon, and 1 lb Al per 1000 lb steel. Add graphite to give 0.25 to 0.30 per cent C.

The advantages of this modification of regular practice as listed by Mr. Fassotte follow: 1. Elimination of pig iron and ferrosilicon from the cupola charge. 2. Reduced consumption of ferrosilicon in the converter. 3. Appreciable reduction of blowing loss in converter. 4. Increased flexibility and production through reduction in blowing and slagging time. 5. Longer life of converter linings. 6. Reduced quantity of converter slag and easier removal.

CHINA: Students in the Bailie School at Sandan are shown pouring metal from the cupola at the school foundry. This is one of the schools where boys are trained to take their places as active members of the Chinese co-operatives. (Authenticated News photo)

The disadvantages enumerated include: 1. Increase in capital expenditure for mixers and heavier cranes. 2. Heavier structure and larger area required by the melting plant. 3. Higher coke ratios in cupola due to all-steel scrap charges. 4. Greater wear on cupola refractories. 5. Extra labor and up-keep entailed by the use of mixers. 6. Fuel and lining cost of the mixers.

Use of silica sand to offset the attack of the iron oxide in the slag on the converter lining is unique, and presents a thought that might be used in other applications where there is severe attack on the lining—for example, in the cupola. Would it be beneficial to add silica sand, or fire clay (either raw or calcined), or some other material to counteract the corrosive effect of the cupola slag? Should this substance be introduced in the charge, along with the blast, or at some intermediate point? Why it is necessary, as the saying goes, to "add enough limestone so that the lining will flow out the slag hole?" I predict that the next surge in melting improvement will be in the cupola and it is long past due.

Watch the Slag

Another thought bearing on the above: What bearing does the composition of the slag have on the "pin-hole" problem in acid arc electric practice? This defect is seldom encountered in side-blow converter practice. Is this due to the composition of the converter slag? If so, how does this slag differ from acid electric slag? Adding excessive amounts of aluminum or silicon is not the answer. I would suggest a new approach to the "pin-hole" problem, bearing in mind that good steel cannot be made without due regard paid to the composition of the slag.

Oxygen has been used in the converter blast in England with very satisfactory results. The report is that by 10 per cent enrichment of the blast with oxygen, they have reduced blowing losses by 2 per cent, halved the blowing time, cut down the use of pig iron in the cupola, and restricted the additions of ferrosilicon.

The other paper dealing with converter practice in England is entitled "The Production of Carbon and Alloy Steels by the Side Blown Converter Process," by F. Cousans of Hadfields, Ltd., Sheffield. It was presented before the Institute of British Foundrymen at the 1947 meeting. This was the exchange paper at the American Foundrymen's Association

(*Concluded on page* 318)

the grinding job

Floor stand snagging steel castings on a Safety Rite-Speed Grinder running at 9,500 surface feet per minute. This is heavy duty production work requiring a wheel that can "take it" yet give fast grinding action and low costs.

the wheel

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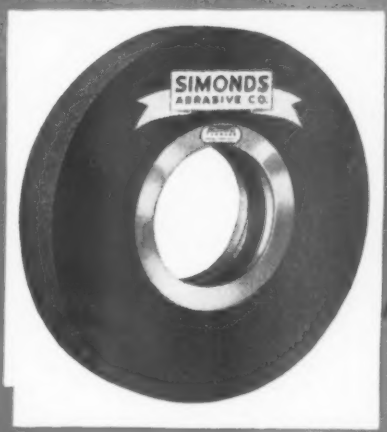

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Ask those whom we have served in the past what this has meant to them.

Further information will be furnished upon request.

Very truly yours,
WESTOVER ENGINEERS

C. E. Westover

CEW/cv

(*Concluded from page* 316)

convention in 1947. This paper covers much of the same ground as the paper of Mr. Fassotte previously referred to. In addition he states "It is known that consideration has been given to the conversion of a large bottom-blown bessemer plant to one of equal capacity of side-blown units."

As previously stated, both papers are of much interest to anyone who has to do with the manufacture of steel. The lesson to be learned is let us have research, research and still more research!

Euclid, O. SAMUEL R. ROBINSON

Management Books

Policyholders Service Bureau, Metropolitan Life Insurance Co., One Madison Ave., New York 10, has published a booklet, "An Introduction to Job Evaluation." Purpose of the book is to give executives a simplified explanation of job evaluation from the practical standpoint of the problems faced by management.

It points out the reasoning processes on which job evaluation is based, requirements for a successful program, the steps involved and the pitfalls commonly encountered.

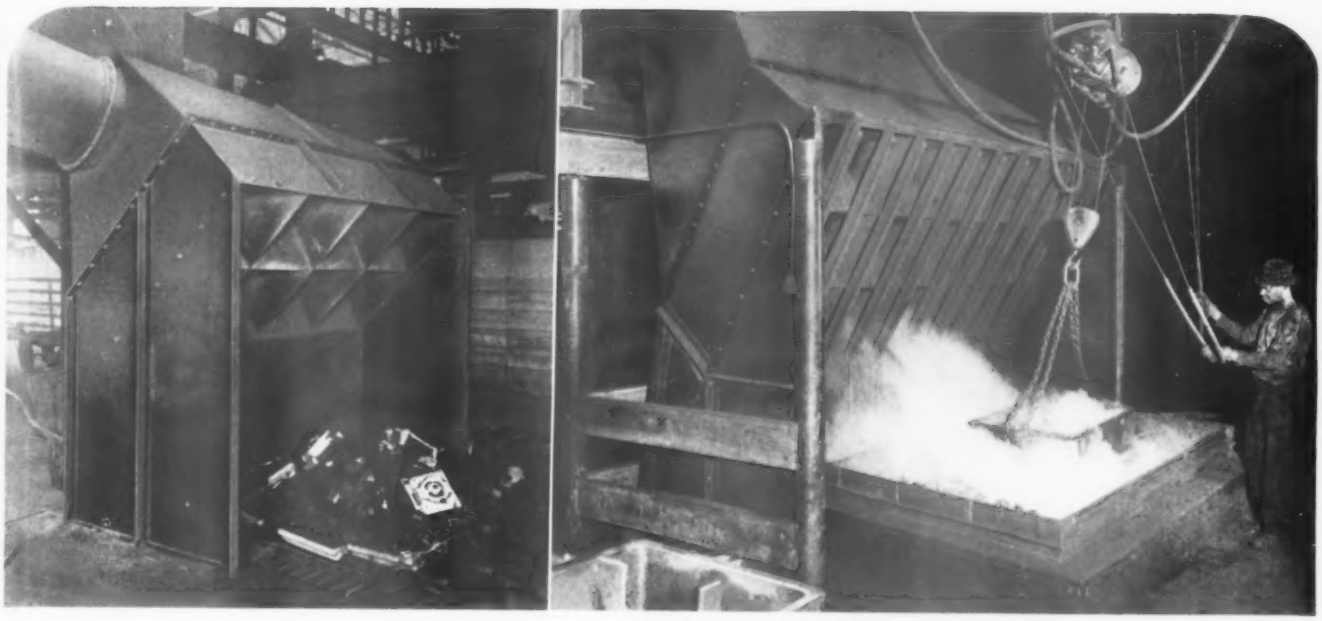
A second booklet, entitled "Functions of the Corporate Insurance Executive," digests results of a survey conducted among more than 250 companies in the United States and Canada to secure a comprehensive picture of insurance administration in business. It suggests responsibilities of the insurance executive in devising plans of risk elimination or control, through insurance or other means, that will safeguard the enterprise against insurable financial losses.

Book Review

Shot Peening, cloth, 181 pages, 6 x 9 in., published by American Wheelabrator & Equipment Corp., Mishawaka, Ind. Price $1.50.

This book is an attempt to bridge the gap between the technical expert and the potential user of the shot peening process. That gap has been widened during recent years by the progress made in research and development and the rapid growth of interest in the shot peening process.

First part of the book is devoted to a discussion of the applications and advantages of shot peening and the equipment and procedures involved. The second part covers the theory of prestressed surfaces in relation to shot peening and reviews the history of surface compression methods and their relation to fatigue.



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*U.S. Patent 121,704

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CARE IN HOUSEKEEPING

Assists Foundry Production

ONE OF the most modern of small nonferrous foundries is that of Charles F. Elchinger, New Orleans, successor to Koretke Brass & Mfg. Co. Ltd. Although this southern city is better known for its beauty spots, historical lore and as a vacation resort, it has a great amount of industry of a widely diversified nature. As one of our country's largest seaports a large part of its industry is devoted to shipbuilding and ship repair. The foundry of Charles F. Elchinger caters to this trade almost exclusively in making brass and bronze castings for ship hardware and ship repair work.

Due to the extremes of weather and service to which marine hardware and other brass and bronze equipment are subjected, only the highest standards of production and quality of product can be used. The foundry equipment, methods of supervision and control are the contributing factors of this organization's product. The melting equipment, shown in the view above, consists of two 600-lb and two 300-lb gas-fired tilting crucible furnaces utilizing silicon carbide crucibles.

Furnace charges are carefully checked by the plant metallurgist to assure the proper alloy for the particular castings to be poured from that melt. Accurate temperature control, which is easily attained in this type furnace, is maintained throughout the melt. These furnaces can be brought to heat from cold in 2 hours and 15 minutes. If the furnace is warm, as would be the case for the second and subsequent heats, only 1 hour and 15 minutes is required to bring the furnaces up to full heat. Depending on the particular alloy of brass or bronze of the melt, furnace temperatures range from 2100 to a maximum of 2300° F.

During the entire process of melting, the metal is protected against direct flame contact by a complete covering of borax and glass, which is introduced with the first charge. It melts readily and forms a protective covering throughout the entire melting time. Production is so scheduled that an entire melt can be poured, thus eliminating any holding of the metal in the furnace and possible contamination. Pouring is done as quickly as possible, the only holding being done in the hand ladles at the direction of the metallurgist who, with his pyrometer, checks the metal for the proper pouring temperature for the particular casting being made.

The foundry floor is kept clean and free of obstructions. Molding operations, carried out in the center foreground shown in the lower illustration, are done in a neat and efficient manner with a minimum scattering of sand. These good housekeeping practices together with intelligent supervision and the precision control of melting are the major factors contributing to the production of high quality brass and bronze castings.

Cast Iron Pipe Has Long Life

A record of the remarkable endurance of cast iron water pipe, based on a report of a study directed by a joint committee representing the American Water Works Association, New England Water Works Association, and the Institute of Water Supply Utilities, is shown in a 20-page brochure by the Cast Iron Pipe Research Association, 122 South Michigan Ave., Chicago 3. The report, titled "Survival and Retirement Experience With Cast Iron Water Mains," covers in detail 25 cities, 23 in the United States and 2 in Canada, including neighboring communities having a total population of 6,960,132 people and 55,986,403 ft of cast iron water distribution mains ranging in size from 4 to 72 in.

The first pipe main was laid in 1817, and each year since then additional mains have been installed as the population increased. Today, 91.3 per cent of all these cast iron mains still are in service. Much of the abandonment of the 4-in. pipe has been due to fire protection requirements. Leaving this size out of consideration, 96.1 per cent of all cast iron pipe laid in the cities studied still is in service. Charts and tables in the brochure show the amount of pipe laid and percentage still in service by the respective sizes, for each area studied.

Utica, N. Y., laid the first 6-in. pipe in 1849 and 98.2 per cent of all 6-in. laid from that date up to the present still is in service. Philadelphia laid the first 8-in. pipe in 1822 and 99.2 per cent of all pipe this size laid during the past 125 years still is in service. Alexandria, Va., laid its first cast iron pipe in 1852 and 99 per cent of all sizes laid from that date up to the present still is in service.

One table covers the cement-lined pipe laid in 16 of the 25 cities. The oldest cement-lined pipe was laid in 1924. Of 1,975,451 ft installed, 99 per cent still is in service.

A NEW SERVICE

We announce to pattern shops and foundries that we can now furnish pattern and core box castings without the necessity of lightening core boxes or backing off master patterns or core boxes. If you will send us your master pattern or core box or core stick, we shall be glad to quote you and supply complete information.

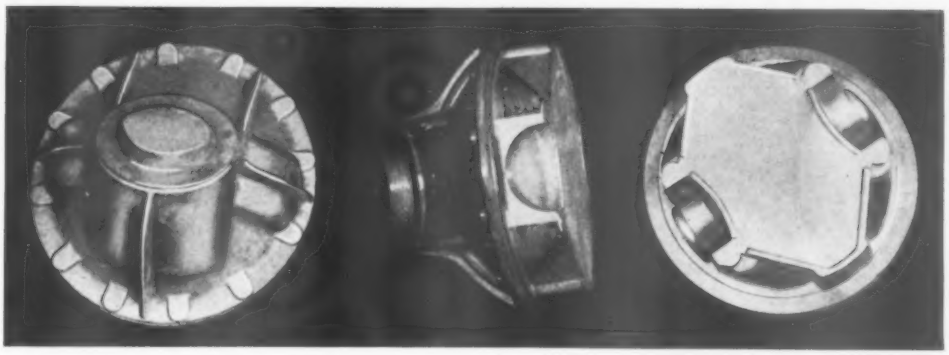
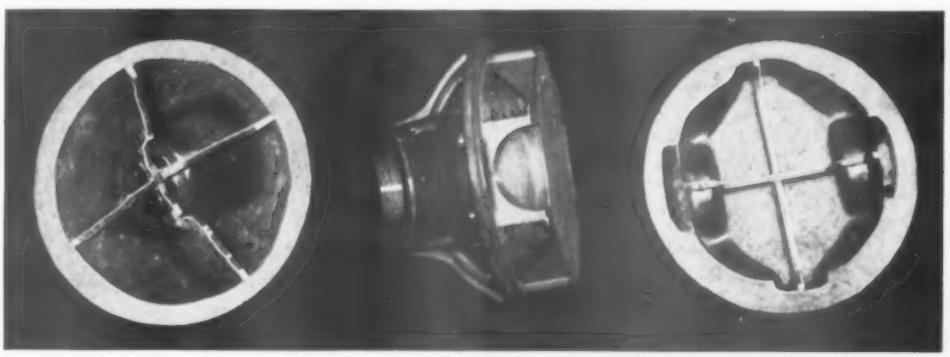
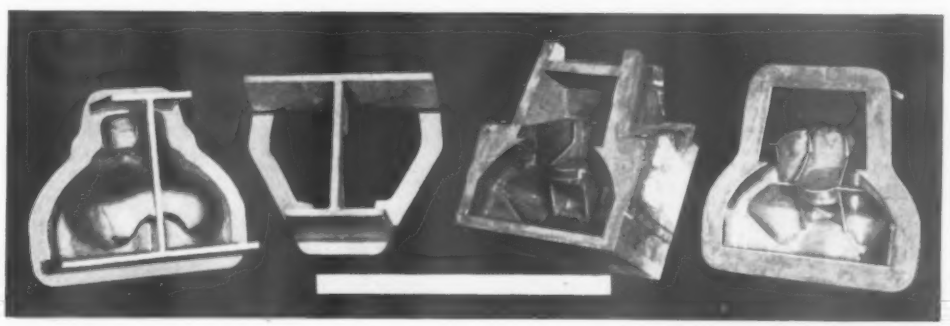


Photo shows face of pattern castings made from master pattern.



Pattern castings, showing method of lightening out.



Photographs by courtesy of Erie Malleable Iron Company

Core box casting made from solid wood master core box, showing backing frame and method of backing off.

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COPE and DRAG PLATES

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PROFIT BY OUR MANY YEARS OF EXPERIENCE

Fig. 1—Instrument in use checking mold dryness

Mold Dryness

Measured by New Device

By R. E. HADADY
Engineer
American Instrument Co.
Silver Spring, Md.

IN April, 1947, the Chambersburg Engineering Co., Chambersburg, Pa., initiated a search for an instrument which could be used to determine accurately when a foundry mold is sufficiently dry to be poured. It had found that the amount of heat applied to a mold, or the length of heating time, would not give a true indication of the mold's dryness. The instrument desired was to be capable of making a nondestructive test on the mold and should give quick readings in order to be suitable for production use.

The company approached the American Instrument Co. with the idea of adapting the latter's sensitive humidity indicating element, the Electric Hygrometer, to this problem. As a result, a new instrument known as the Electric Hygro-Cel was developed for testing the dryness of foundry sand molds. It has been able to eliminate the guess work in this phase of foundry control, with an accompanying reduction in defective castings reported.

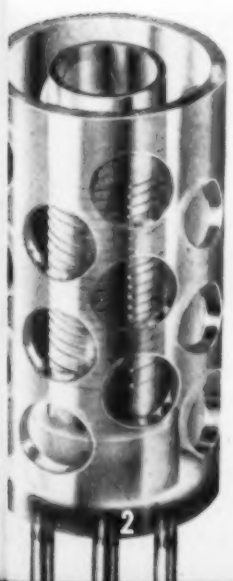
Fig. 1 shows C. D. Galloway, foundry superintendent, Chambersburg Engineering Co., demonstrating the use of the instrument in checking the dryness of a mold. The company's experience has shown that when the evaporation of moisture from the mold drops to approximately zero, the mold is sufficiently dry for pouring. When the instrument is placed in contact with the sand mold surface, it detects the evaporation of moisture. Since sand molds are porous, the moisture evaporating from the surface is a relatively true indication of the moisture present throughout the entire depth of the mold. Therefore, the readings taken on the mold's surface provide a quick indication of the condition of the mold.

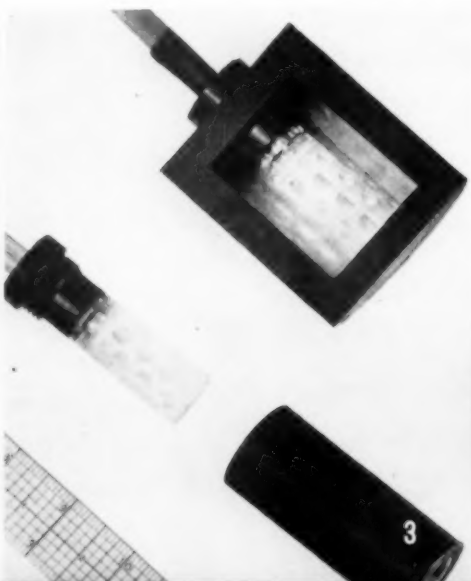
The Electric Hydro-Cel consists of an electric sensing element (Fig. 2) mounted in a ruggedly constructed housing. This element is highly sensitive to moisture and responds instantly to minute changes. Any change in relative humidity changes its electrical resistance. The resistance changes are transmitted to the indicator in terms of electrical current and are visually shown by the small portable instrument called an indicator.

The instrument is especially suited to production work because its sensing element responds in less than one second to either decreasing or increasing moisture in the surrounding

(*Continued on page* 324)

Fig. 2—This sensing element, encased in either of the two housings shown in Fig. 3, is highly sensitive to moisture. Changes in relative humidity affect its electrical resistance, which is transmitted to the indicator shown in Fig. 4





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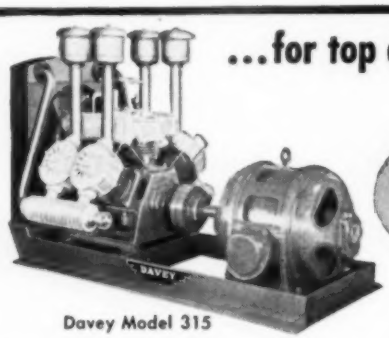

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DAVEY

P&P-102

DAVEY COMPRESSOR CO. *Dealers in Principal Cities*

(*Continued from page* 322)

air. Also, its sensitivity makes possible the detection of moisture changes as small as 0.1 per cent relative humidity. The sensing element has demonstrated in other fields of moisture measurement that it will provide accurate readings over a period of years.

Fig. 3 illustrates two different types of sensing element housings which have been used successfully by the Chambersburg Engineering Co. The small volume of the housings is desirable, since the evaporating moisture from the mold surface rapidly raises the vapor pressure in the housing, thus providing quick

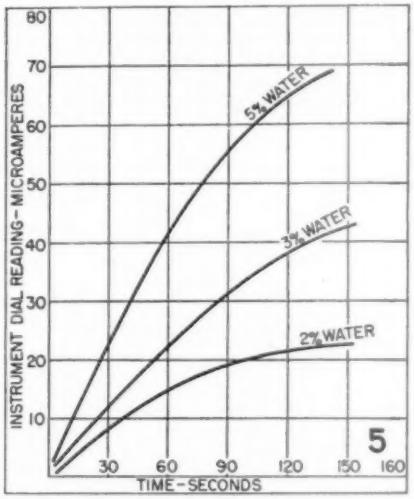

Fig. 5 — Typical evaporation rate from mold samples of various moisture concentration as measured by instrument

readings. The small size also permits the instrument to be used in small spaces or on irregularly shaped surfaces.

The indicator shown in Fig. 4 converts the electrical resistance on the sensing element into terms of relative humidity. The light weight of the indicator (9 lb) and its compact construction allow it to be transported easily. An adjustable strap permits suspending the indicator from the shoulder of the operator; readings may be taken while the instrument is in this position. The electrical power supply for the indicator is a small 1½-volt dry battery. Controls consist of a battery switch, adjustable rheostat to compensate for the battery output, and a selector switch for connecting the element into circuit so that the output of the battery may be adjusted.

In practice, the Chambersburg Engineering Co. has found that the Hydro-Cel can be effectively used as a "go" and "no-go" gage. The

(*Concluded on page* 326)

Immediate Delivery!

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TYPE LJS
JOLT SQUEEZERS

- Portable or Stationary
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- Platen alignment always accurate and quickly adjustable
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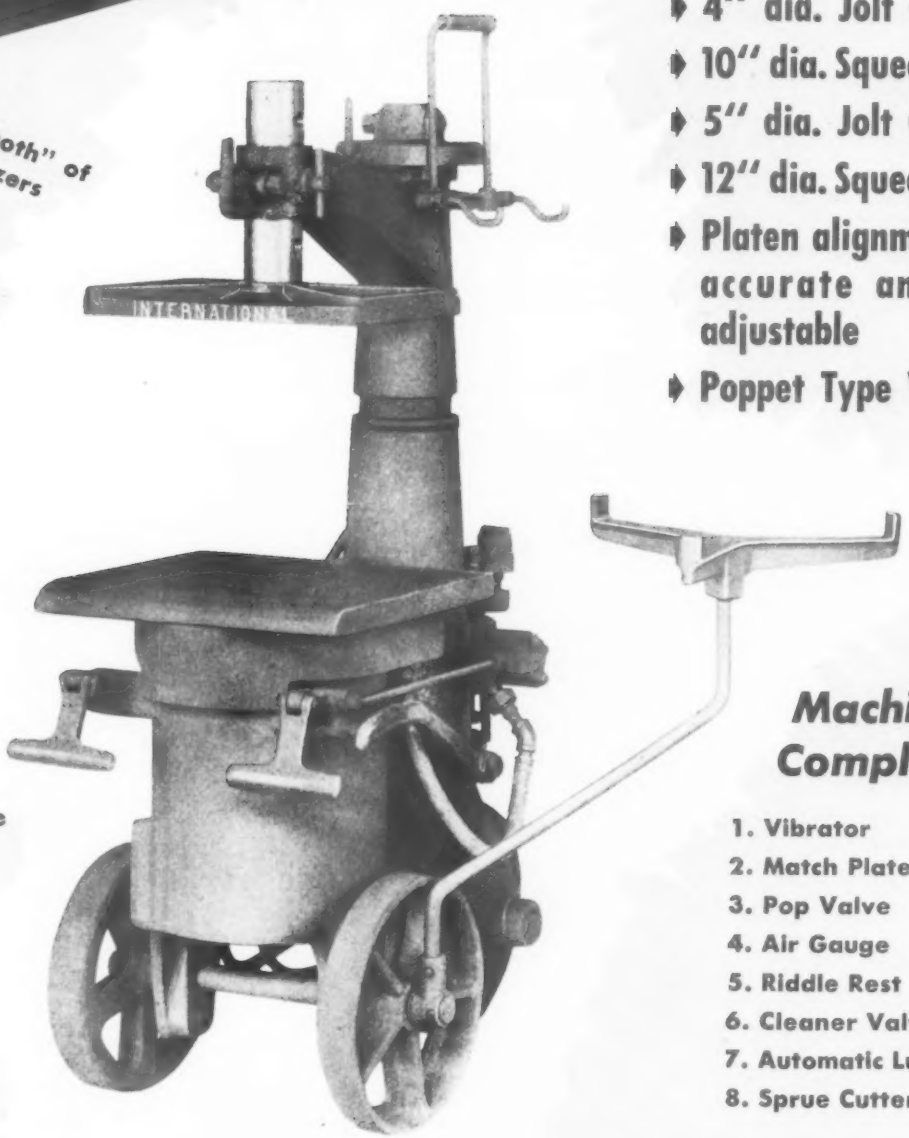
The "Behemoth" of Jolt Squeezers



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Long-lasting because of Sturdy Construction - extra heavy weight

INTERNATIONAL MOLDING MACHINE CO.

LA GRANGE PARK, ILLINOIS • (Suburb of Chicago)

(*Concluded from page 324*)

company's experience has shown that if a rise in relative humidity above atmospheric conditions is indicated within 30 seconds after the instrument has been placed in contact with the mold, then the mold contains too much moisture for safe pouring. The sand mold is usually tested at several points on its surface, since all sections of the mold do not dry at the same rate.

Curves Show Evaporation Rate

Fig. 5 shows three typical curves representing the rate of moisture evaporation from samples of molds containing various moisture concentrations. The curve shows the rate in seconds at which the relative humidity rises inside the instrument housing. Curves of this type are not required in actual practice. A mold which is sufficiently dry for pouring will cause the relative humidity within the Hydro-Cel housing to rise only a few scale divisions after 30 seconds of contact with the mold. In contrast to this a mold which contains too much moisture will cause the relative humidity indication to rise possibly 30 scale divisions or more within 30 seconds after the instrument is placed on the mold to obtain a test reading.

Foundrymen Form Management Groups

Local groups of the Gray Iron Founders' Society continue to be formed as part of the society's plan to initiate forty such groups throughout the United States.

In Boston a New England Management Group was formed with George F. Hutchins II, Standard Foundry Co., Worcester, Mass., as chairman; E. H. Bradley, Builders Iron Foundry, Providence, Rhode Island, vice chairman, and Thomas I. Curtin Jr., Waltham Foundry Co., Waltham, Mass., secretary-treasurer.

A Philadelphia-Reading Management Group was formed at a recent meeting in Reading, Pa. Chairman is H. P. Good, Textile Machine Works, Reading; vice chairman, W. B. Morley, Olney Foundry Division, Link-Belt Co., Philadelphia, and secretary-treasurer, I. J. Rentz, Textile Machine Works.

The Milwaukee group elected the following officers: Chairman, M. O. Holtan, Slinger Foundry Co. Inc., Slinger, Wis.; vice chairman, R. D. Peters, Brillion Iron Works Inc., Brillion, Wis., and secretary-treasurer, C. S. Wieland, Mid-City Foundry Co., Milwaukee.

Minnesota foundry executives met at Minneapolis and chose as chairman, J. E. Quest, J. F. Quest Foundry Co., Minneapolis, and William G. Jackson, Crown Iron Works, Minneapolis, secretary.

A Northern Indiana Management Group was organized at Fort Wayne, Ind., with John E. McIntyre, Sibley Machine & Foundry Corp., South Bend, Ind., chairman; C. F. Sterling, Sterling Castings Corp., Bluffton, Ind., vice chairman, and James E. Digan, Logansport Foundry Industries Inc., Logansport, Ind., secretary-treasurer.

Book Review

"An Introduction to Metallurgy," by Joseph Newton, second edition, 645 pages, published by John Wiley & Son, New York, price $5.50.

This book is designed to present an introduction to the field of metallury as a whole and to provide a foundation for advanced and special studies in metallurgical subjects. The important features include an expanded discussion of pyrometallurgy, new material on corrosion, more alloy diagrams, and the addition of a section on powder metallurgy.

The contents are divided into two sections, one on adaptive metallurgy and the other on extractive metallurgy. Under adaptive metallurgy, the discussion includes metals, alloys, physical properties of metals and alloys, fabrication, heat treatment, and corrosion. Approximately six pages are devoted to a briefing of castings production.

Factors discussed under extractive metallurgy include sources of metals, ore dressing, chemical principles, fuels and refractories, pyrometallurgy, hydrometallurgy and electrometallurgy.

NFA Opens Office in Detroit

Further step in the expansion program of the National Founders Association is the establishment of a Detroit office under the supervision of Martin J. Ewald, 416 Penobscot Building.

Mr. Ewald has been prominent in labor relations matters and legal affairs in Michigan for a number of years. He also served as executive director for the industry members of the Detroit Regional War Labor Board.

E. E. Fries heads an enlarged activity in NFA membership service—making his headquarters in the Chicago office, and covering the foundry industry throughout the Middle West.

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Consistent Uniformity of Smith L-O Core Oil Improves Quality of Castings.....

The consistent uniformity of Smith L-O Core Oil is reflected in the quality of your cores, and ultimately in the worth of your castings. It is a core binder worthy of your consideration.

You will find all grades of Smith L-O Core Oils have the following outstanding features: excellent workability — guaranteed uniformity — maximum fast drying at both low and high temperatures, thus providing cores having quick collapsability at shakeout; also the desired toughness and flexibility to eliminate breakage.

These and many other features are characteristic of Smith L-O Core Oil . . . the *only* core oil that is Dow-Therm processed. Try this uniform, high quality binder in your foundry. You'll like it!

Smith L-O Core Oil

WAREHOUSE STOCKS AVAILABLE
In The Following Cities

- Foundry Service Co. Birmingham, Alabama
- E. R. Frost Co. Minneapolis, Minnesota
- Hill & Griffith Chicago, Illinois
- Frank C. Maley Detroit, Michigan
- William F. Rose Tomkins Tidewater Terminal South Kearny, New Jersey
- Southwest Foundry Supply Co. Houston 7, Texas
- Malcolm G. Stevens Arlington, Mass.
- M. W. Warren Coke Co. St. Louis, Missouri
- Western Foundry Sand Co. Seattle, Washington
- Western Industrial Supply Co. Portland 14, Oregon

Smith L-O Core Oil

CORE WASH ROD DIP LIQUID PARTING

SMITH OIL & REFINING CO.
INDUSTRIAL OILS DIVISION . . . ROCKFORD, ILLINOIS

NEW Equipment AND Supplies

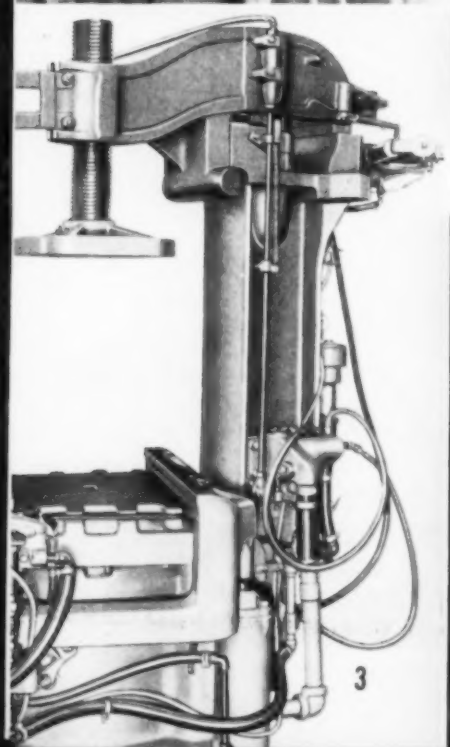
(1)—Face Shield: American Optical Co., Southbridge, Mass.—Plastic face shield is light in weight, durable and said to be easily attached to the company's respirators. It protects the eyes and major part of the face against the impact of foreign particles striking from the front. Outer edges of the shield are protected by a vinyl plastic binding. Shield may be worn over regular prescription glasses.

1

(2)—Magnet: Ohio Electric Mfg. Co., 5900 Maurice Ave., Cleveland—Lifting magnet employs a new type of welded construction whereby the outer ring and top plate are welded together on top of the magnet. This method places the weld in a position where, it is said, it cannot be cracked or damaged by frequent blows against the outer ring. Thus the magnet remains hermetically sealed against moisture indefinitely, it is claimed. Three sizes are offered: a 39-in. diam magnet weighing 2800 lb; a 4-coil, 55-in. diam magnet weighing 6800 lb, and a 4-coil, 65-in. diam magnet weighing 10,200 lb. Each of the latter two sizes is also available with six or eight coils that give extra lifting strength.

2

(3)—Molding Machine: Milwaukee Foundry Equipment Co., 3238 West Pierce St., Milwaukee 4—Jolt squeeze rail stripper is of arm-type construction and locks its squeeze control lever above the platen against operation until the platen is in correct squeezing position. The squeeze arm is always locked in back position and sudden drop of stripping frame from draw position is prevented by air-operated plungers. Machine is equipped with a 21-in. squeeze piston capable of exerting a total squeeze pressure of 31,200 lb at 90 lb line pressure. It possesses a jolting capacity of 2000 lb at this same line pressure. It has an overall height of 100 in., 20-in. opening stripping frame and is capable of handling flasks up to 1000 sq in. in size.



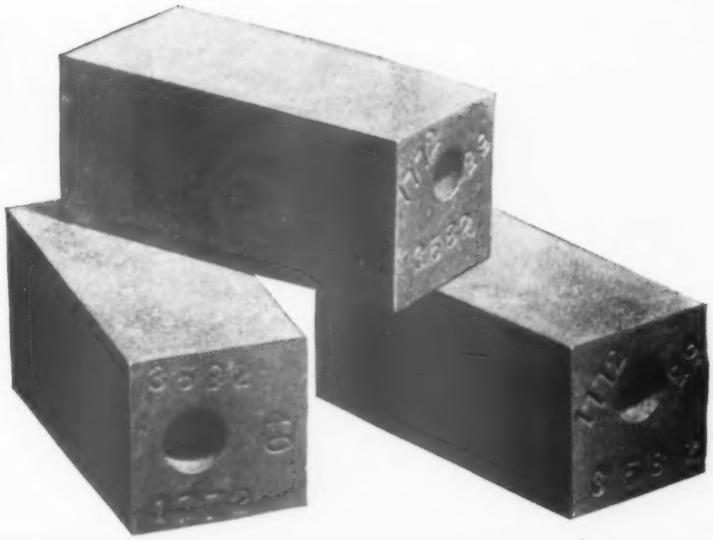
3

(4)—Twin Furnace: Randall Foundry Equipment Corp., Newburgh Station, Cleveland 5—Interconnected furnaces utilize top firing principle. Each of the furnaces has a separate cover containing 12 burners. While firing one furnace, the products of combustion travel over to the second unit and preheat the crucible in that furnace. The operation is continuous, and with gas at 19 cfm it is claimed that a heat can be pulled from a No. 70 crucible every 20 to 25 minutes. Due to the top firing principle, it is said that the furnace cannot plug, since slag cannot reach the burners. Other advantages claimed are lower fuel cost, less temperature loss, in-

(*Continued on page* 330)

4

DEPENDABLE SLAG HOLE BLOCKS



Slag hole block failures during a continuous-pour cupola run cease to be a problem with CARBOFRAX silicon carbide blocks on the job.

Retention of uniform hole size is assured by the dense slag-resistant CARBOFRAX blocks. Even with the blast on, rapid cutting away of this opening is avoided successfully. For runs of 18 to 24 hours duration, the slag stream stays almost constant. Troublesome, expensive shutdowns necessary for slag hole block replacement are eliminated.

In many plants, CARBOFRAX blocks are constantly proving their dependable durability. You, too, may profit by their use. Complete information, including stock sizes and dimensions of blocks for which moulds are available, can be obtained promptly by writing direct to Department L-117, The Carborundum Company, Refractories Division, Perth Amboy, New Jersey.

CARBOFRAX Slag Hole Blocks

BY **CARBORUNDUM**

TRADE MARK

"Carborundum" and "Carbofrax" are registered trademarks which indicate manufacture by The Carborundum Company

THREE STEPS TO BETTER CASTINGS
with ASBURY GRAPHITE PRODUCTS:

VISIT US AT BOOTH 325

Foundrymen's Convention
Phila., Pa.
May—3 to 7

KLEEN-A-KAST
an outstanding shake-on facing

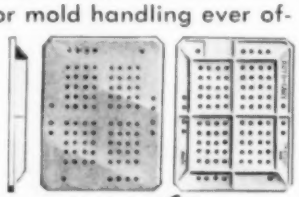
PLUMBAGO CORE WASH
Better Finish — Easier Cleaning

PIPE REDUCER
CARBON & NON CARBON

The Asbury Graphite Mills, Inc.
MAIN OFFICE & WORKS
ASBURY, NEW JERSEY

The Answer...
TO A FOUNDRYMAN'S HEADACHE

ECONOMY and EFFICIENCY are the watch-words in present-day foundry operation. ROTO-CAST MOLD CONVEYORS provide the simplest, most economical, practical method for mold handling ever offered the foundry industry. ROTO-CAST QUALITY ALUMINUM ALLOY BOTTOM BOARDS are designed for efficiency, long life, safety and economy. Full range of sizes to meet every requirement. Write for literature and details.



ROTO-CAST *Foundry Equipment, Inc.*
COLDWATER, MICHIGAN, U. S. A.

(*Continued from page* 328)

creased crucible and lining life, less oxidation and metal shrinkage. One gas and one air line connects both furnaces.

Hoist: Yale & Towne Mfg. Co., Philadelphia Division, 4530 Tacony St., Philadelphia 24—Wire rope hoist has one-piece, ribbed steel cast frame designed for use with lug, plain trolley, motor trolley or winch type mounting. Hoist is equipped with a large-diameter drum with grooves for guiding the cable as it winds. Drum has sufficient capacity to provide full standard lift without overlapping of cable. Reversing-type

motor is rated to operate under constant service with full load without destructive overheating. Hoist is available in ¼, ½ and 1-ton capacities.

Graphite Base Refractory: McFeely Brick Co., 816 Ligonier St., Latrobe, Pa.—Graphite base refractory brick, mortar and ramming mix are said to have nonwetting qualities to molten metal or slag and high temperature resistance. It is claimed that erosion has been reduced to a minimum under normal operations, thus producing a cleaner metal and longer refractory life. The new brick has had successful application in cupolas, spouts and ladles, as well as specialty installations such as pour-out boxes and in mold work. It has been used with acid and basic metal slags and under reducing and oxidizing conditions. It is claimed that there is no carbon pick-up by the metal because of the company's technique in proportioning and forming the refractory ingredients and the firing methods used in finishing the green ware. The brick is available

(*Continued on page* 332)

You can boost individual productivity up to 300% with

The BELL Prime Mover*

On wheelbarrow jobs, your men can handle loads averaging only 250 pounds. With the BELL Prime Mover, they can move 1000-pound loads . . . quicker . . . with less physical effort.

Whether it's the back-breaking job of hauling sand from the muller . . .

or toting heavy scrap on the shake-out gang . . .

the Bell Prime Mover can do it faster, easier, and at far lower cost. Present foundry users have proved this.

With the Prime Mover, even elderly men can do the work of a team of youngsters.

The Prime Mover's big, zero-pressure tires roll over rough surfaces.

And *Power* . . . see how it walks up a 20% grade with full loads.

FEATURES:

- takes half-ton loads up 20% grades
- bucket holds 10 cu. ft. . . . 18 with sideboards
- beltless, chainless transmission
- fully enclosed engine protected against dirt and moisture
- clutch, engine, transmission all run in oil
- half-ton platform body available; also 50-inch "baby bulldozer" blade
- switch from bucket to platform without tools . . . in less than a minute
- turns in its own length (63½"); width 31½"
- 3-gallon tankful of fuel gives 8 hours continuous service

A PRODUCT OF **BELL** *Aircraft* CORPORATION

★ PATENTS & T. M. REG. PENDING. COPYRIGHT, 1948

We've gathered some foundry application data on the Prime Mover which you may find helpful. It's yours for the asking. Please use the coupon.

SEND COUPON NOW

Bell Aircraft Corporation,
P. O. Box 1D-5, Buffalo 5, N. Y.

Please send me engineering and cost data on the Prime Mover, including users' experience in iron and steel foundries.

Name .....

Address .....

Company .....

City, Zone & State .....

The

Foundrymen and Engineers

of the

W. G. Reichert Engineering Co.

1060 Broad Street Newark 2, New Jersey

invite you to discuss your problems

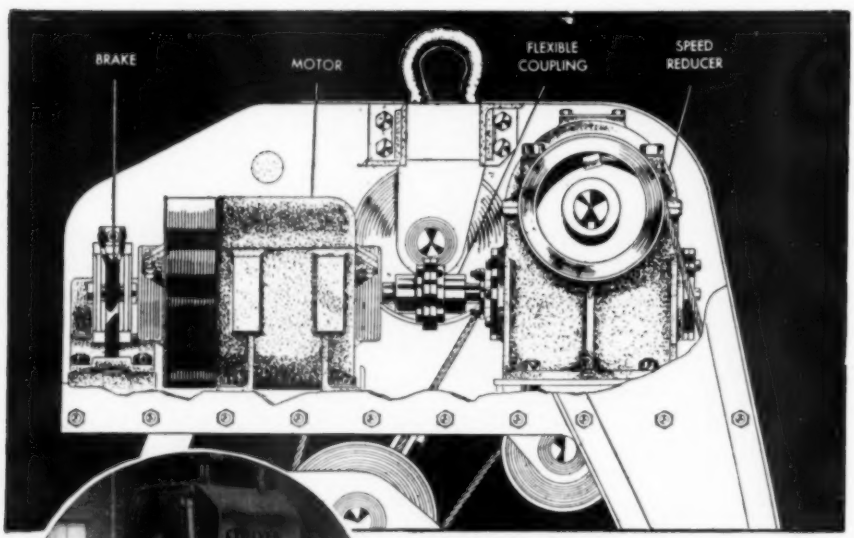
with us

At our Exhibit - 323

Philadelphia Convention A.F.A.

- 1948 -

Improve the Quality Reduce the Cost Increase the Production



HOOK 'ER ON—PLUG 'ER IN

ABOVE YOU SEE WHY the Erie Electric Bucket works in its own headroom controlled from the crane cab. This sturdily constructed bucket needs only to be hooked over the crane hook and power line plugged in. The man in the cab controls the opening of the bucket from cracking the lips to any degree of opening or closing. The extra in-built weight permits easy penetration. *Write for complete particulars.*

ERIE STEEL CONSTRUCTION CO
1085 GEIST ROAD • ERIE PA

ERIE BUCKETS
THE MOST COMPLETE LINE BUILT

ALSO AGGREMETERS
ELECTRIC OVERHEAD CRANES
PORTABLE CONCRETE PLANTS

(*Continued from page* 330)

in both the 8½ x 4½ x 2½ and 9 x 4½ x 2½ in. series as well as in cupola block and other specialty forms. The ramming mix is adapted to monolithic lining of ladles and spouts.

Sump Pump: Gardner-Denver Co., P.O. Box 1020, Quincy, Ill.—Sump pump is designed to overcome breaking of the pump shaft seal because of water pressure. Pump is operated by a vane-type air motor and closed-type pump impeller is made of hard, abrasion resistant alloy.

Built-in oiler lubricates all moving parts; oil chamber has 1-qt capacity for 24 hr operation. Pump is light in weight and handles facilitate lifting and carrying.

Aluminum Paint: Speco Inc., 3142 Superior Ave., Cleveland 14—High heat resisting aluminum paint is made for use on exterior and interior metal surfaces where temperatures reach 1500° F, or any wood, brick or concrete surfaces exposed to extreme heat. It is said to fuse with metal surfaces to form a permanently bright, elastic finish that resists moisture, corrosion, acids, alkalis and industrial fumes. Paint sets up in 4 hr and dries overnight. It is available in 5 gal, 1 gal, 1 qt, pint and half-pint cans.

Threadless Fittings: Stanley G. Flagg & Co. Inc., 1421 Chestnut St., Philadelphia 2—Black, malleable iron socket type threadless fitting is designed for brazing to steel or wrought iron pipe. Fitting cup is reamed to accommodate the outside diameter of standard pipe and to produce a shoulder or stop for the pipe when it is inserted. Pipe and fittings are brazed together by using silver brazing alloys. These fittings

(*Continued on page* 334)

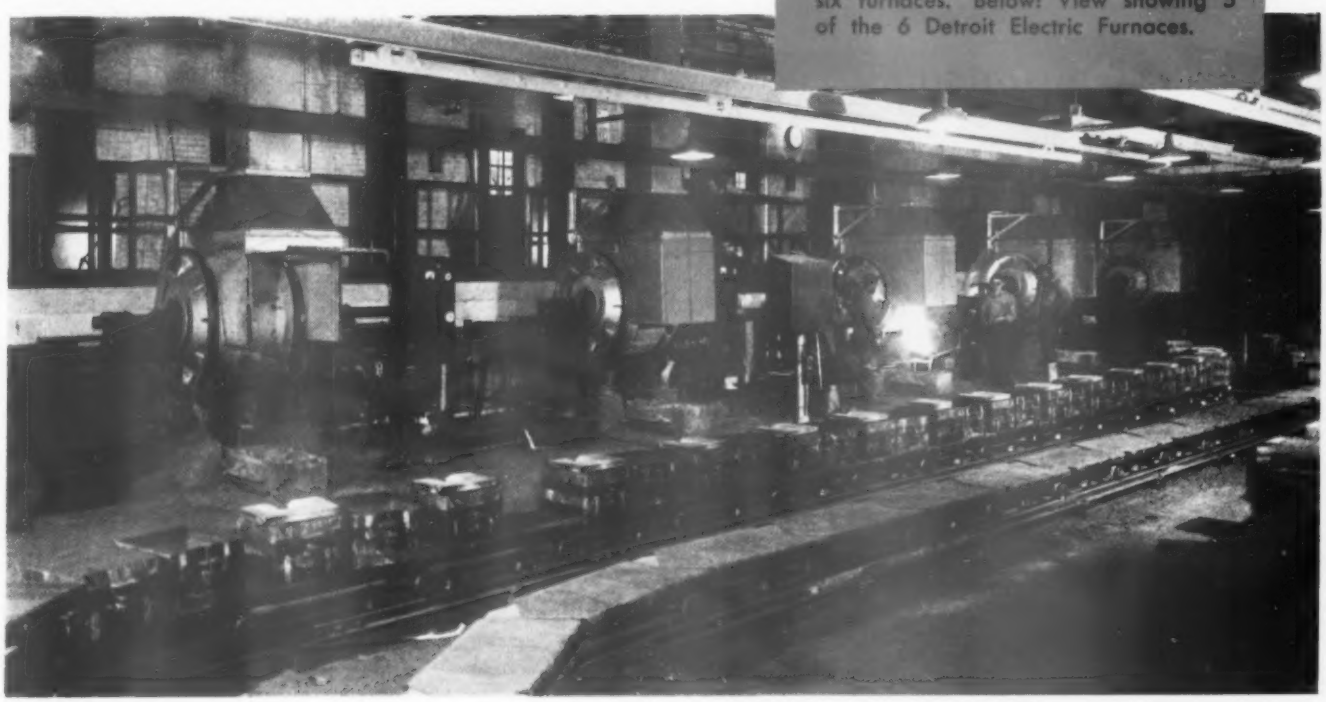
One man operates six DETROIT ELECTRIC FURNACES producing up to 6000 lbs. per hour

If faster and cheaper melting of higher quality metal interests you, take a look at this layout of Detroit Rocking Electric Furnaces that melt bronze for hydraulic pressure castings in a large eastern foundry. With only 1 man at the controls, these six Type LFY, 700 lb. capacity Detroit Electric Furnaces *can produce 6,000 lbs. of bronze per hour.* Two 2-man gangs handle the pouring. One man using 700 lb. capacity trucks on an elevated platform charges all six furnaces from the rear. Three furnaces feed bronze to the continuous mold conveyor; the remaining three are used for miscellaneous sand castings. Less time, less labor, more metal —*and note this money saving fact:* 25% of the total charge is borings and turnings which were formerly sold as low value scrap.

Detroit Electric Furnaces melt ferrous and non-ferrous metals. They are made in capacities from 10 to 8000 lbs. Our engineers can suggest specific models and layouts that *will simplify and speed metal melting* in your plant. Write for complete facts.

Above: View of rear charging platform showing single charger loading one of six furnaces. Below: View showing 5 of the 6 Detroit Electric Furnaces.

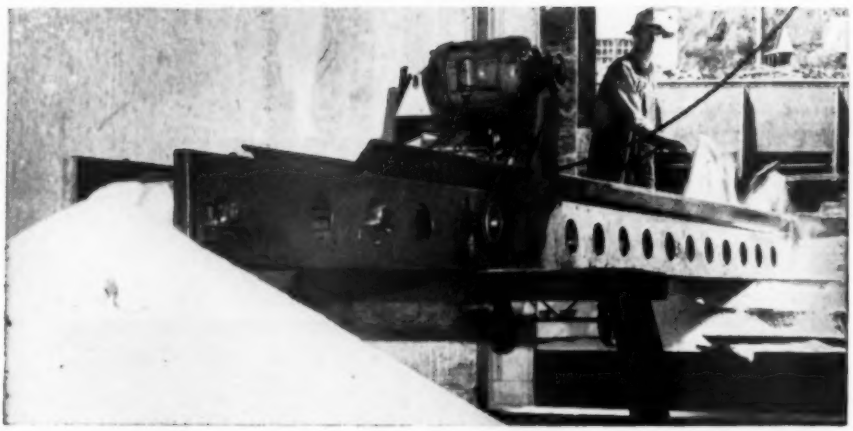
Hall during the 1948 Foundry Congress in Philadelphia May 3 to 7." "See a Detroit Electric Furnace in operation at Booth 1220 in Exhibition



DETROIT ELECTRIC FURNACES

DETROIT ELECTRIC FURNACE DIVISION • KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

FOREIGN OFFICES: BIRLEC, LTD., Birmingham, England, Representative for Europe and British Commonwealth excluding Canada. EQUIPAMENTOS INDUSTRIAS "EISA" LTD., Sao Paulo, Brazil, Representative in Brazil. M. CASTELLVI, INC., 150 Broadway, New York 7, N. Y., Representative in Chile, Argentina, Peru, and Venezuela. CASA COVACEVICH, Mexico City, D. F., Mexico.



USE A TOTE-ALL CONVEYOR . . . . . for faster, lower-cost handling of molding and core sand

VISIT OUR BOOTH NO. 1124 AT THE FOUNDRY SHOW IN PHILADELPHIA

. . . . . SEE the new Tote-All Conveyor equipped with powerful, permanent magnets for removing "tramp" iron from nonmetallic bulk materials.

Tote-All cuts hours and dollars from the job of unloading sand from cars. Also speeds the handling of coal, ashes, pig iron and many other materials. Belt speeds up to 420 fpm, gasoline or electric power, 12 ft. and 16 ft. lengths, 8-in. belt. Special widths and lengths built to order. Available with or without Trail-Hoist (combination trailer and hydraulic lifting device). Easily moved from job to job. Get details on how Tote-All Conveyors can lower your material handling costs. Write MATERIAL MOVEMENT INDUSTRIES, INC., 9257 Laramie Ave., Skokie, Ill.

material movement industries inc.

. . . for lowest cost material handling

"The Outstanding Basic Improvement in FLEXIBLE SHAFT Machinery in 25 Years"

The NEW Strand Rotoflex 4-speed gear drive Flexible Shaft Machine (shown upper right) is another step forward in Strand quality precision tools for faster, easier, more economical production work. The Rotoflex 4-speed gear drive employs a patented, new type of quick change gear drive utilizing 4 positive speeds by a unique and easy method of instantly changing from one speed to another. Rotoflex machines are powered with totally enclosed ball-bearing motors having speeds from 850 to 9000 R.P.M., depending on motor.

Standard type Strand machines, (lower right) give portable rotary power at constant speeds with dependable results in all grinding, buffing, drilling, wire brushing and rotary filing operations. Hundreds of types and models from ⅛ to 3 H.P. available with suitable attachments for your specific requirements.

Distributors in all principal cities

Ask for Bulletin No. 43 and Catalog No. 30

Strand FLEXIBLE SHAFTS

N. A. STRAND & CO.

5010 NO. WOLCOTT AVE.

CHICAGO 40, ILL.

(*Continued from page* 332)

are applicable for 150-lb working steam pressure lines at 450° F, or 300 lb, nonshock, oil, water or gas lines at 150° F. These fittings are said to provide the strength and tightness of a "one-piece" system for moderate pressure and temperature systems, and because the full wall thickness of the pipe is utilized, thinner walled pipe may be installed.

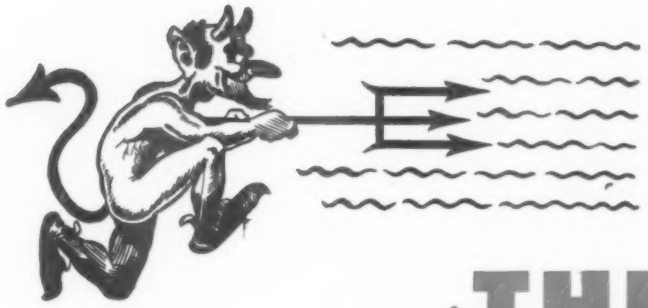
Grab: Palmer-Shile Co., 16033 Fullerton Ave., Detroit 27—Universal grab can be used for picking up all types of heavy boxes, crates, bales or other loads where hooks may be used. The heavier the load, the tighter the grip. It is made of heavy forged

steel hooks with an adjustable spread which provides for easy handling of loads from 16 to 48 in. Grab is available in two sizes with capacities of 1000 or 2000 lb.

Electrode: Hobart Bros. Co., Hobart Square, Troy, O.—Heavy coated electrode is designed for direct current straight polarity or alternating current at higher current ratings to increase welding speed on poor fit-up work. At higher currents the spatter loss is said to be unusually low, and there is less tendency to stick when welding with a close arc. Electrode is available in 3/32, 1/8, 5/32, 3/16 and 1/4 in. diam.

Lubricant: G. W. Smith & Sons Inc., 5400 Kemp Rd., Dayton 3, O.—Lubricant was developed principally for lubricating the piston (ram or plunger) on cold chamber die casting machines, but also serves as a lubricant for ejector and guide pins on pressure die casting dies; and for use on all movable parts of perma-

(*Continued on page* 336)



Soffel's THERMOTOMIC PROCESS

(Patents Pending)

Keeps metal molten!

300 lb. aluminum bronze bearing cap cast with THERMOTOMIC feeding ring core under riser. Note small feeder opening which facilitates removal of riser from casting, resulting in greatly reduced cleaning costs.

FOR:

STEEL · · GRAY IRON
BRASS · BRONZE · COPPER
ALUMINUM · · INGOT MOLDS

THERMOTOMIC is a new Exothermic compound that can be molded into any desired shapes and used as feeding inserts under risers or hot-tops or as facing application where it is desired to maintain fluidity of the casting metal. THERMOTOMIC permits reversal of the trend towards large feeding heads and risers, making it possible to use heads that are shorter and more compact with very small feeder openings. This permits easy removal of heads and gates and sharp reductions in cleaning and finishing costs. When THERMOTOMIC is used as inserts or as facing in the mold, heat in thin metal sections is retained until the main body of the casting has solidified, thus eliminating shrink cracks and improving grain structure and tensile strength.

Thermotomic ABC
FOR
Aluminum and Magnesium Castings

THERMOTOMIC ABC is the first successful exothermic feeding compound ever to be developed for aluminum and magnesium castings. Results obtained from its use are amazing. Feeding metal in heads or risers is maintained in the fluid state for 20 to 30 minutes. Great savings are effected through reduced riser dimensions. Feeding heads or risers are reduced in volume 80% and more, and their removal from the casting is greatly facilitated due to the restricted feeding necks.

An Exothermic Feeding Head Compound and Pipe Eliminator For Aluminum and Magnesium Castings

SOFFEL'S AL-X31 LIQUIDIZER was developed for use in conjunction with THERMOTOMIC ABC. In order to secure best results and maximum feeding, we strongly recommend that AL-X31 LIQUIDIZER be applied on the feeding heads or risers. When so applied, AL-X31 LIQUIDIZER enters into an intense exothermic action which will actually raise the temperature of the feeding metal. The heat produced is sufficiently great that, even if the metal has solidified, it will re-melt. After AL-X31 LIQUIDIZER has completed its exothermic action, it forms a soft, insulating cover on the feeding metal. This cover confines the heat generated and further delays solidification of the feeding heads or risers.

SEE FIRST SHOWING OF NEW CARBON-FREE LIQUID SLAG PIPE ELIMINATOR; ALSO DEMONSTRATION OF THERMOTOMIC COMPOUND, AT OUR BOOTH NO. 420 AT THE FOUNDRY CONGRESS IN PHILADELPHIA

PITTSBURGH METALS PURIFYING COMPANY

"Fluxes for all Metals and Alloys"

1352 Marvista Street **Pittsburgh 12, Pa.**

(*Continued from page* 334)

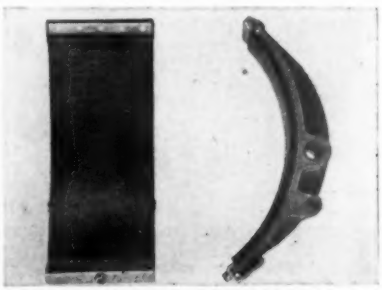
nent molds. Being highly viscous it is generally applied with brush or swab, but can be sprayed where necessary. It contains no fats or heavy carbonizing materials, and is said to have high heat-resistive qualities and to prevent scoring and sticking of parts on which it is coated. Available in 1, 5 and 55-gal containers.

Crane: Day-Smith Hydraulic Crane Corp., Camp Hill, Pa.—Mobile hydraulic crane lifts and carries up to 6000 lb. Ten feet of vertical boom travel is provided with corresponding cable travel of 16 ft. Maximum clearance under hook is 18 ft, 6 in. Sidewise movement of the boom is limited to assure stability when handling maximum loads. Crane movements are controlled by one man from the driver's seat. The half-track chassis

works effectively on almost any kind of terrain from factory floor to rutted mud, and operates at speeds up to 40 mph.

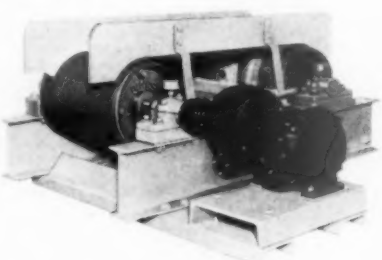
Metals Comparator: General Electric Co., 1 River Rd., Schenectady 5, N. Y.—Electronic instrument is designed to provide a quick, nondestructive comparison of either magnetic or nonmagnetic metal parts with a standard. It has been used to differentiate between annealed and unannealed steel bars, and to sort finished metal parts with different compositions or heat treatments. Comparator employs a balancing network and indicating instrument in a 11 x 17 x 22-in. steel cabinet to which is connected an external test coil. A reference specimen is placed in the test coil and adjustment is made to secure the initial balance. This is indicated by a zero reading on the indicating instrument. Parts to be tested are inserted briefly in the coil one by one and compared with the standard on the basis of the dial reading. Unit operates on 60-cycle, 115-v current and weighs 60 lb. Test coils range from ½-in. to 3 in. I.D.

Brake Shoe: Cutler-Hammer Inc., 244 North Twelfth St., Milwaukee 1—New brake shoe with clamp-on lining has a vise-type clamp on the shoe which holds the lining in place and prevents it from shifting



in any direction, it is claimed. Clamp consists of a permanent buttress at the lower edge of the shoe with a self-aligning screw jack at the top edge. The brake lining, of folded and compressed metallic asbestos, is placed in the shoe and the clamp tightened. This exerts a force on the end of the brake lining, forcing it into the curvature of the shoe and holding it firmly in place. Advantages claimed for this construction are that it provides a completely smooth brake lining surface, larger braking area and permits renewal of brake linings without removing shoes from brake.

Magnetic Separators: Dings Magnetic Separator Co., 4708 West McGeogh Ave., Milwaukee 14—Self-contained horizontal and inclined magnetic pulley type separators are



designed to provide automatic removal of tramp iron from loose nonmagnetic materials. Incorporating a permanent magnet, they are intended for installation at discharge of chutes, hoppers and conveyor belts or they can be fed by hand or by various material handling devices. Standard models are available with belts

(*Continued on page* 338)

CHOOSE A

CLEARFIELD MIXER . . .

for CONVENIENT INSTALLATION

EASE OF CONTROL

CONSTANT OPERATION

Efficiency in your sand preparation system demands that your mixers be conveniently installed, easily controlled and constantly operated without breakdown. Clearfield mixers are designed and built to provide these qualities.

All sizes are built on one level and require minimum head room, yet with the discharge sufficiently high to make pits unnecessary. Heavy, rugged construction, coupled with moderate speed of moving parts, eliminates vibration and excessive wear that causes breakdowns.

There is a Clearfield mixer to meet your needs. Write today for Catalog No. 79 for complete details.

CLEARFIELD MIXER

MIXES, TEMPERS AERATES

CLEARFIELD MACHINE COMPANY

CLEARFIELD PENNSYLVANIA, U. S. A.

See our exhibit at Booth No. 505
A.F.A. Convention, Phila., Pa.

NATIONAL

Carbon Bonded Crucibles
and
Silicon Carbide Refractories
Including
Furnace Covers, Furnace Linings, Base Blocks & Repair Cement

DEALERS:

Bison Industrial Supply Co.	Buffalo, N. Y.
Cincinnati Railway Supply Co.	Cleveland, Ohio
Klein-Farris Co.	Boston, Mass.
Pacific Graphite Co.	Oakland, Cal.
Southwest Fdry. Supply Co.	Houston, Texas
Snyder Foundry Supply Co.	Los Angeles, Cal.
E. J. Woodison Co.	Detroit, Mich.
Walter Zeis Fdry. Supply & Equip. Co.	St. Louis, Mo.
R. B. Harrison—P. O. Box 1053,	Reading, Pa.
Charles R. Hilb—Provident Bank Bldg.	Cincinnati, Ohio

NATIONAL CRUCIBLE CO.
PLANT & OFFICE: PHILADELPHIA 18, PA.
Mgr. WESTERN Dist.: A. C. ECKBORG CHICAGO 28, ILL.

(*Continued from page* 336)

from 12 to 60 in. wide and pulley diameters from 12 to 30 in.

Planer: Parks Woodworking Machine Co., 1546 Knowlton St., Cincinnati—Planer is made with heavy welded base, alloy head, high-speed knives and hardened gears and is said to be capable of operating at full capacity at all times. It is equipped with a 4-knife cutterhead and is powered by a 3 to 10 hp motor which operates at 3600 rpm. Capacity is 20

in. wide by 6 in thick. Table is 34 in. long and 20 in. wide; base is 36 x 41 in. and overall height is 47 in.

Speed Changer: Link-Belt Co., 2045 West Hunting Park Ave., Philadelphia 40 — Variable speed changer is rated at 20 hp for speed variation ratios of 5 to 1 and 6 to 1, and 25 hp for speed change ratios of 2 to 1, 3 to 1 and 4 to 1. Other sizes range from 1/2 to 15 hp capacity, ratios up to 6 to 1; all suitable for horizontal or vertical mounting, including an integrally mounted motor and helical gear reduction set. All units are compact, all-metal, fully enclosed and self-lubricating.

Aluminum Alloy: Federated Metals Division, American Smelting & Refining Co., 120 Broadway, New York 5—Aluminum alloy called Tenzaloy, is designed to produce high strength and hardness in castings without heat treatment. It is said to provide properties equivalent to those obtainable by conventional heat treating methods. Other advantages claimed for the alloy are good machinability, corrosion resistance and whiteness. Nominal composition is 0.8 per cent copper, 0.4 per cent magnesium, 8.0 per cent zinc and the balance aluminum. It may be cast with

(*Continued on page* 340)

NUMBER 1 IN A SERIES EXPLAINING WHY

DUSTUBES COST LESS TO MAINTAIN AND OPERATE

Dustube Filters
NO ABRADING METAL CONTACT
EASY TO SHIP, STORE, HANDLE

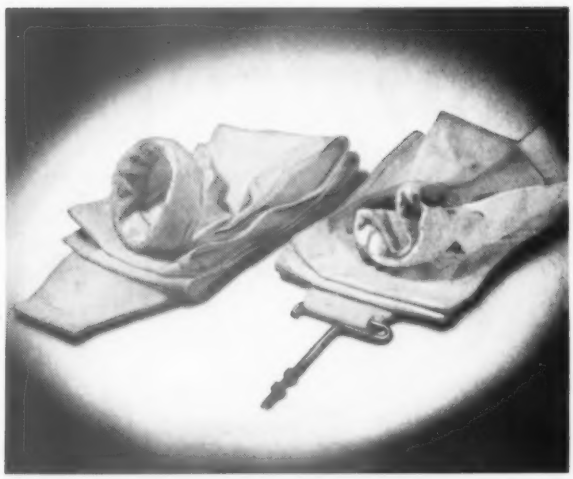
Ease of Inspection
CLEAN, SAFE, SIMPLE
NO PARTS TO REMOVE

Filter Replacement
TAKES ONLY A FEW SECONDS
REQUIRES NO TOOLS

Power Savings
LOWER RESISTANCE TO AIR FLOW
LOWER AIR VELOCITIES

High Efficiency
NEARLY 100% EFFICIENT
BY CONVINCING TESTS

Better Dust Removal
SIMPLE, FAST, THOROUGH
SHORTENS CLEANING TIME



FILTER SIMPLICITY FOR DUST CONTROL ECONOMY

No dust collector is better than its filters. That's why cloth-tube type filters were selected for the American Dustube. Inherent advantages of this simple, effective design provide peak efficiency plus maximum operating economy.

Greater efficiency, because Dustube filters trap all dry dusts, regardless of particle size or concentration, with nearly 100% efficiency.

Greater economy, because filters last longer . . . maintenance is cut to the minimum . . . less power is needed due to lower resistance to air flow. Freely suspended tubes are never under tension nor in contact with abrading metal. Inspections, and infrequent filter replacements, take only a few seconds of one man's time. Filter cleaning is fast and thorough with the simplified shaker system.

Investigation will prove these facts. Check up. See for yourself why Dustube is the best investment.

Write for your copy of Catalog 72. It explains in detail the advantages of Dustube design.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St., Mishawaka 2, Indiana

dustube
DUST COLLECTORS

PYRAMID
NOZZLES
ALL CERAMIC

★ ★

SEE US AT
BOOTH
No. 336

★ ★

Learn about savings in time and money through use of all ceramic Pyramids for your blast machines.

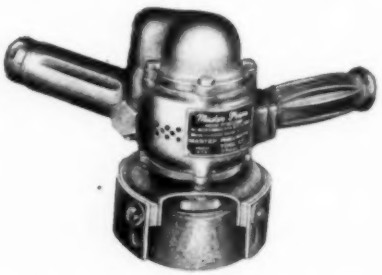
ABRASIVES AND
BLASTING EQUIPMENT

GEORGE PFAFF, INC.
10-61 JACKSON AVE.,
LONG ISLAND CITY 1, NEW YORK

(*Continued from page* 338)

standard foundry procedure and equipment into sand, plaster or permanent molds.

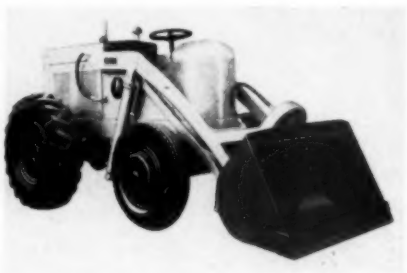
Grinder: Master Pneumatic Tool Co. Inc., Orwell, O.—Light weight vertical air-powered grinder is available in 6000 and 8000 rpm free speed models. It is designed for working overhead or in awkward po-



sitions. It weighs 7 lb, has small overall dimensions and positive governor control and off-on control. Low-slung handles are said to reduce gyroscopic action, and large oil reservoir with automatic lubricator gives constant lubrication.

Goggle: Univis Lens Co., 401 Leo St., Dayton, O.—Safety goggle is made from an allyl casting resin which combines lightness, the safety features of plastic and is said to resist surface scratching. Goggles are available in four styles and in a selection of sizes.

Tractor Shovel: Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Ill.—Tractor shovel of ¾ cu yd capacity now has bucket control which dumps and closes the bucket



by fingertip actuated hydraulic power in addition to hydraulic lift and lowering of the bucket. Bucket can be dumped either gradually or instantaneously as desired.

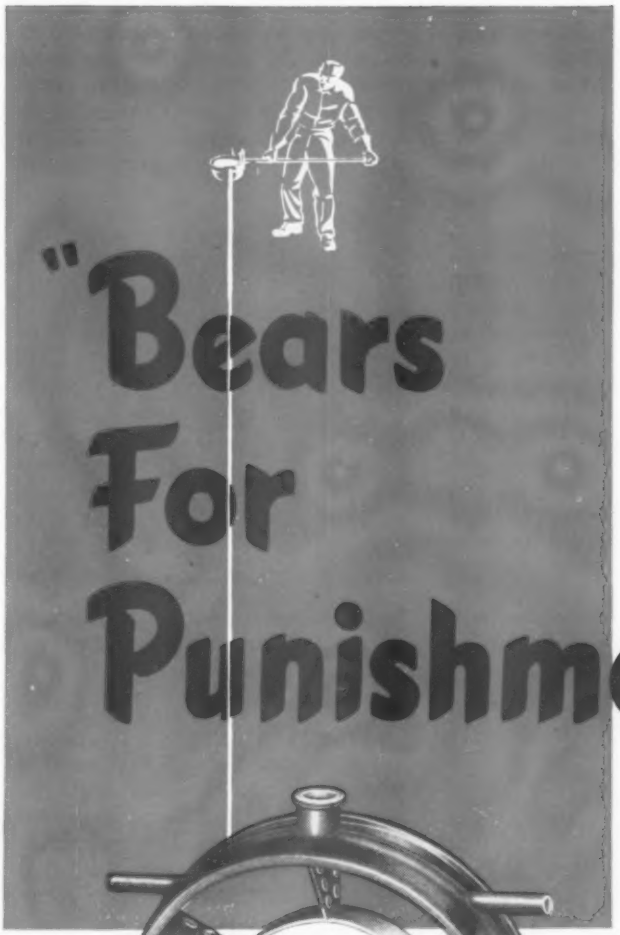
Metal Tags: Metal Marker & Mfg. Co., 1384 East 40th St., Cleveland—Standard line of metal marking tags permit large run economies on limited quantities. Made of brass, copper, aluminum, zinc, tin plate, zinc coated steel, or steel, these tags are said to be weather resistant, fireproof, and to withstand the hardest use and abuse. They may be quickly attached by drive screws, escutcheon pins, stapling or tieing. According to the manufacturer, a wide range of standard sizes and shapes are available and lettering and consecutive numbering can be embossed or stamped to specification in quantities from hundreds to millions.

Carbon Determinator: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Carbon determinator has one-piece burette-absorber which is said to prevent temperature differences between the burette and absorber, eliminating gas expansion or contraction during the analysis due to heating or cooling. Instrument is equipped with a combustion gas cooler which cools gas to room tem-

perature before it enters the burette. Compensation for atmospheric pressure is automatic and leveling off is said to be easy and accurate. Burettes are available in several ranges for use with cast iron, steel, low carbon alloys and organic materials.

Atmosphere Selector: Surface Combustion Corp., P. O. Box 907, Toledo 1, O.—Atmospheric gas selector increases the company's dew point recorder by enabling it to analyze consecutively atmospheres from as many as six different sources in timed sequence. Selector consists of a six-way valve for six incoming atmosphere sources, motor, and electric time clock; so arranged that at preset time the source of atmosphere supply to a dew point recorder is automatically switched from one line to the next. The five remaining lines which are not feeding the recorder are continuously purged. The source from which the atmosphere being an-

(*Continued on page* 342)

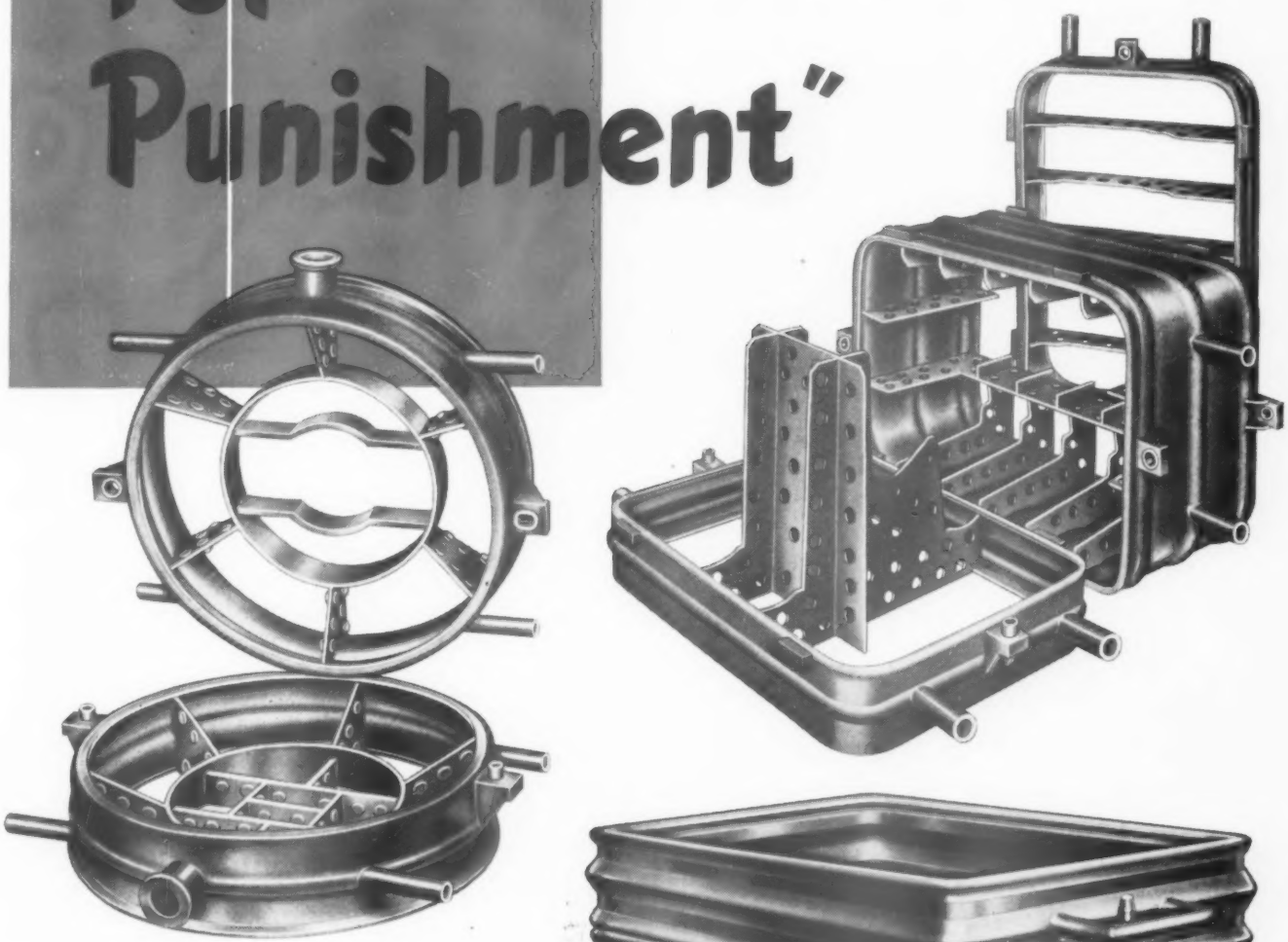


"Bears For Punishment"

That's the term one foundry superintendent used to describe his Shanafelt Flasks as he watched them on the shakeout. He wasn't quite sure of their age so we checked the record. That group was bought in 1934—almost 14 years of hard service and still helping to pour good castings.

All Shanafelt Flasks are custom made to your own exact specifications. Pin centers, pin lugs, bushings, etc., can be made so your new Shanafelt Flasks are interchangeable with the equipment you now have.

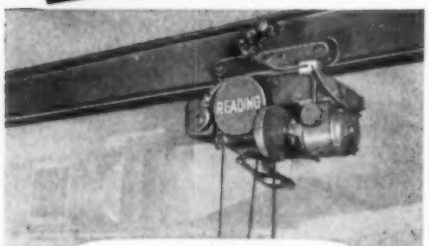
The next time you buy Flasks, why not get our estimates of cost and delivery? Shanafelt Flasks are not overpriced and deliveries are surprisingly good for today's conditions.



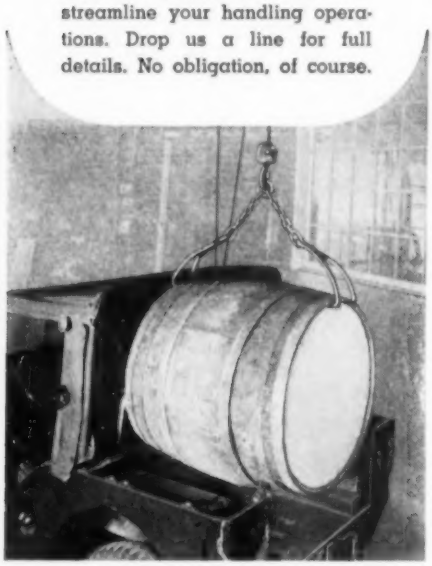
SHANAFELT
SEALTYTE CHAPLETS
AND HARDENED STEEL
FLASK PINS & BUSHINGS
are shipped promptly from our large stocks . . . .

THE SHANAFELT MANUFACTURING CO.
2600-2700 Winfield Way N. E. Canton, Ohio

HOW ONE PLANT
Streamlines
MATERIAL HANDLING



Here's another example that shows how you can get fast, low-cost materials handling, right now. Before installing a *Reading* engineered system, this plant had to wheel heavy barrels to the mill via hand trucks. To streamline the operation, *Reading* Engineers were called in. A one-ton Reading Electric Hoist, operating on a built-in parallel trolley, was recommended. Now barrels move faster—less manpower is tied up—and the entire operation costs far less!
Let Reading Engineers give you *practical* suggestions that can streamline your handling operations. Drop us a line for full details. No obligation, of course.



READING CHAIN & BLOCK CORPORATION
2108 ADAMS ST., READING, PA.
CHAIN HOISTS • ELECTRIC HOISTS
OVERHEAD TRAVELING CRANES

READING HOISTS

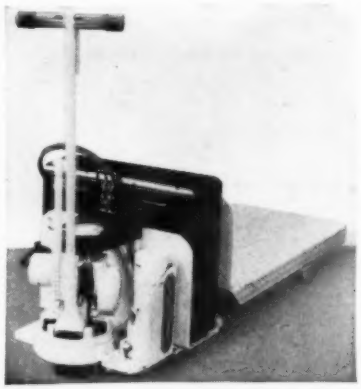
(*Continued from page* 340)
alyzed is indicated by numbered pilot lamps on the control panel and the frequency at which atmospheres may be analyzed for dew point is set by a control dial.

Dust Collector: Torit Mfg. Co., Walnut & Exchange Sts., St. Paul 2—Dust collector filter cloth area provides a 4 to 1 filter velocity (4 cfm through each square foot of filter cloth). There are 20 filters, 16 x 18 in., spaced 7/8-in. apart to permit utilization of the entire area of both sides of each filter. Machine is equipped with a 1/2-hp, 3450-rpm motor and 7 11/16 x 1 1/2 in. fan and develops 320 cfm, 6700 fpm air velocity and 4 in. static pressure

through one 3-in. inlet. Cabinet measures 40 in. high, 29 1/2 in. wide and 26 in. front to back. Dust pan is 3 in. deep, 25 in. front to back and 26 1/4 in. wide.

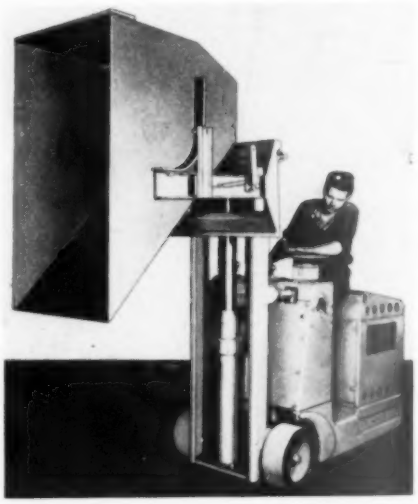
Lubricant: Carbide & Carbon Chemicals Corp., unit of Union Carbide & Carbon Corp., 30 East 42nd St., New York 17—Synthetic lubricant for use on bearings and other parts of machines operating at high temperatures is said not to oxidize, polymerize or decompose thermally to form sludges and varnishes or carbonaceous residues. Down time due to clogged or stuck bearings is reduced and machine service life increased, it is claimed.

Platform Truck: Moto-Truc Co., 1953 East 59th St., Cleveland 3—Hand platform truck is built with either a 6 or 12-v motor unit and can be furnished with either a foot operated hydraulic pump or an electric hydraulic pump. Battery mounting is 4 in. off the floor, providing a low center of gravity, and interchangeable motor unit can be detached by removing four bolts and one wire connection. Controls are mounted on the roller type handle which has spring return to neutral position, cutting off current to motor and applying brake to front drive wheel. Truck comes in 4000 and 6000-



lb capacities, lifts a 4000-lb load 3½ to 4 in. and travels at 2½ mph with load and 3½ mph empty.

Dump Hopper: Lewis-Shepard Products Inc., 282 Walnut St., Watertown 72, Mass.—Self-dumping hopper attachment may be mounted on any of the company's gas or electric fork trucks. Operation of the hopper is controlled by the operator from his position on the fork truck. After the load has been dumped, the hopper returns itself to and latches in an upright position. Hopper is constructed of welded steel and is fur-



nished in a range of capacities. It is said to be easily and quickly attached or removed.

Hand Files: Severance Tool Industries Inc., 753 Iowa St., Saginaw, Mich.—Hand files of cemented carbide with ground teeth come in either 20 or 30 teeth per in. and in either ¾ or 1¼-in. widths. File is com-

(*Continued on page* 344)

Now AN IMPROVED ALL-PURPOSE DESPATCH COREMASTER DRAWER-TYPE OVEN

New Features!

- **Comes Assembled—Easy to Install.** This self-contained unit is factory-wired, built lower and more compact.
- **Improved Uniflow Heating System** and duct work permit faster and more efficient pre-heating, drying and baking of cores.
- **Unit Fan and Heater** are enclosed in an insulated box which mounts on top of oven body. Ducts are easily connected.

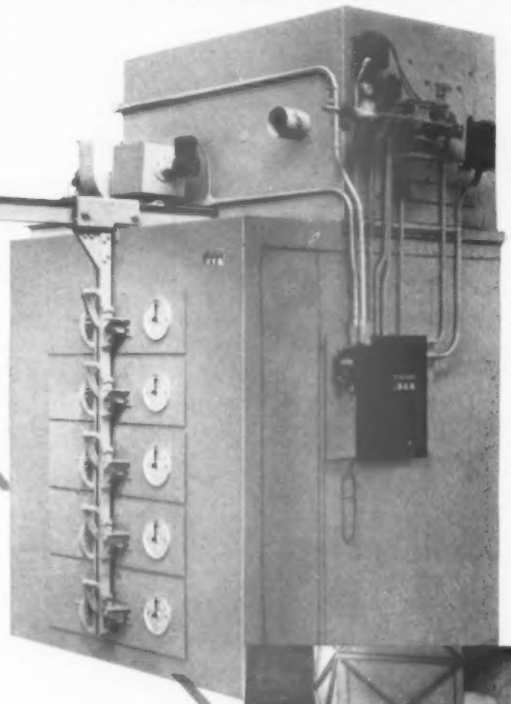
DESPATCH customers said the popular *Coremaster* drawer type foundry oven *couldn't* be made more useful . . . and DESPATCH engineers accepted the challenge! Now *you're* the judge . . .

Always ready for special rush or test jobs, the *Coremaster* is ideal for regular production baking, too. And it bakes *better* cores *faster* now with the improved DESPATCH Uniflow heating system

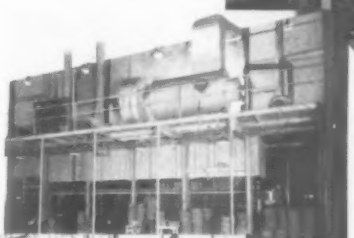
The new *Coremaster* bakes thick and thin cores at the same time and even in the same *drawer* With an extra removable shelf, you can *double* the capacity of a deep drawer for shorter cores.

Drawers load singly or all at once—clock faces show when loads should come out. No heat escapes while loading or unloading—a rear plug on each drawer seals the oven chamber A rugged latch lifts the drawer and most of weight is carried on the overhead trolley, mak ing drawers easy to roll

The new DESPATCH *Coremaster* comes in 24 standard models in 3, 4 or 5 drawer types. Drawers range from 30″x36″ in size up to 48″x72″; in depth from 8″ to 18″



VERTICAL CONVEYOR oil-fired Despatch Oven. Bakes up to 5000 lbs of large or small cores per hour Has built-in cooling section



CONTINUOUS-CONVEYOR Despatch Oven with combination gas-oil-fired heater Conveyor has 38 racks SIZE: 52′ long, 13′ wide, 27′ high

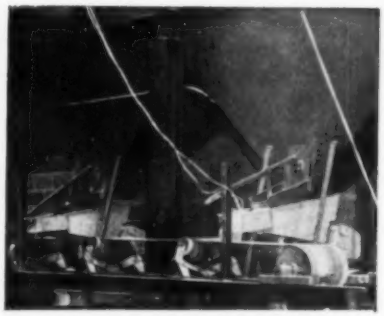
CAR-LOADED OVEN with combination gas or oil-fired heater. Bakes up to 40 tons per batch. Models available up to 200 tons per charge.

WRITE today for new Bulletin J-32.

DESPATCH OVEN COMPANY

Minneapolis Office: 619 S. E. 8th St Chicago Office: 221 N. LaSalle St

DESPATCH OVEN COMPANY



SYNTRON

"Vibra-Flow"

VIBRATORY FEEDERS

Will Handle—

—most all types of bulk materials—coal, sand, limestone, etc. —hot or cold—dry or damp.

At—

—variably controlled rates from pounds to 500 tons per hour—from 110, 220 or 440 volt, 50 or 60 cycle.

To—

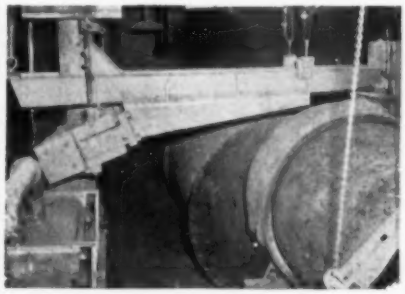
—sand conditioning systems, belt conveyors, dryers, crushers, mullers, etc.

An illustrated folder is available, or—if you'll send us the details of your problem—description of material to be fed, maximum feed per hour, desired length of trough, etc.—our Engineering Department will be glad to submit their recommendations.

SYNTRON CO.

540 Lexington, Homer City, Pa.

If you attend the Foundry Show, be sure to stop and see us—Booths 332 & 334



(*Continued from page* 342)

posed of a combination handle-holder on which two carbide segments are mounted in tandem. Handle is shaped to fit the hand and has a thumb rest and knuckle guard. Carbide segments may be reground when necessary.

Blasting Nozzles: Bodine Tool & Machine Co., 124 West Venango St., Philadelphia 40—Nozzles for blast cleaning apparatus have wear-proof lining, said to be almost as hard as a diamond, which is pro-

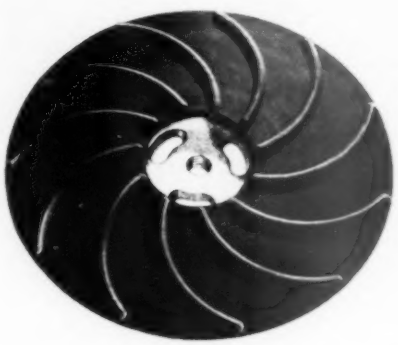
tected from external impacts by a steel shell. Nozzle lining is claimed to hold the initial diameter for several hundred hours and then enlarge gradually. Preservation of initial nozzle inside diameter assures minimum drop in air pressure resulting in continuous efficiency and maximum output. Nozzles are available in sizes from $\frac{3}{32}$ to $\frac{1}{2}$ in. in styles illustrated or can be furnished in special sizes and styles.

Conveyor: Sermat Conveyor Corp., 2350 West 58th St., Chicago—Gas engine or electric motor powered portable conveyors have rubber ply canvas belt and are available in 14-ft and 20-ft sizes. Belts have 1-in. cleats and are designed for handling all bulk

materials. Conveyor has hydraulic lift for raising belt to any position from level to 37 degrees, trailer type hitch and is equipped with 4.00 x 8 pneumatic tires and automobile type springs. It can be furnished with 6.00 x 16 tires.

Motor: Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30—Single phase, capacitor-start, induction-run, squirrel cage motors are rated at $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2, 3, 5 and $7\frac{1}{2}$ hp. Motor is of all steel construction with air openings in lower half of the end brackets to give protection against dripping liquids. Self-sealed, prelubricated ball bearings are said to provide effective lubrication for 5 years without repacking.

Backing Pad: Pratt Mfg. Co. Inc., 614 East Madison St., Fairmount, Ind.—Backing pad for disc sander is made of layers of rubber reinforced with fabric and bonded to a slotted iron hub. Slots in the hub force air through to the back of the sanding disc, keeping it cool, it is claimed. Forced draft action through the spirals on the pad tend to keep the abrasives clean. Flexibility of the rubber pad is said to permit working



various shapes and contours without danger of gouging the work and to provide greater contact area of the disc.

Pallet Truck: Sherman Industries, Division of Sallinger-Sherman Inc., 138 Brookline Ave., Boston 15—Hydraulically-operated hand pallet truck has 2000 lb capacity and is operated by a standard hydraulic jack unit which can be replaced with a spare in 5 minutes. Truck has four-wheel suspension, and two of the wheels swivel 360 degrees. Truck is said to handle all standard pallets and has a lift of $2\frac{1}{2}$ in.

Pressure Casting: Pressure Cast Products Corp., 1028 Vermont Ave., Detroit 16—Complete pressure casting equipment for producing all types of aluminum pattern equipment is offered for lease. Entire equipment with work space for one or two men consumes less than 18 x

(*Concluded on page* 346)

For Cleaning Large Castings Faster

Pangborn AIRBLAST CLEANING ROOM

Loads or Unloads Quickly From Both Ends

Cleaning miscellaneous castings is no bottle-neck job with a PANGBORN AIRBLAST CLEANING ROOM. It loads quickly and easily with either a car or overhead conveyor. Your castings move along swiftly—from shake-out, through the cleaning room and on for grinding and inspection.

PANGBORN AIRBLAST CLEANING ROOMS are built to the size and shape your cleaning task requires. They are illuminated to give the operator maximum visibility of his work . . . constructed to provide automatic abrasive recovery and return for immediate re-use after a cleaning process which removes all sand, refuse and dust.

For years PANGBORN ROOMS have provided foundries with a smoother, more practical cleaning operation.

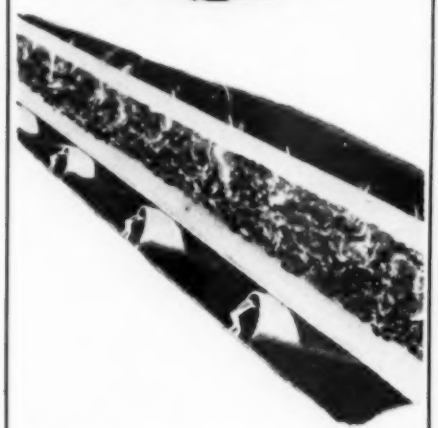
Look to Pangborn for the latest development in blast cleaning and dust control.

For complete details on PANGBORN AIRBLAST ROOMS write: PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md.
Over 25,000 machines serving industry.

Pangborn

BLAST CLEANS CHEAPER with the right equipment for every job

SAHARA
Heat Resisting
BELTING
For Handling Hot Materials



Foundries have been using Sahara Beltings for over 25 years because they are unexcelled for conveying and elevating hot materials.

STANDARD SAHARA is for handling materials up to 300° F. INSULATED SAHARA, combining asbestos and special insulating material with the cotton base, is for use where sustained temperature of materials is from 300° F. to 450° F.

The effective heat resisting qualities of Sahara Beltings is due to special impregnation and insulation. The base of both Standard Sahara and Insulated Sahara is a 37½ ounce, tight-woven duck having a tensile strength exceeding 700# per inch of width. Our double-stitched and *Inner-Locked* construction is employed to permanently prevent ply separation.

May we send you additional information and prices?

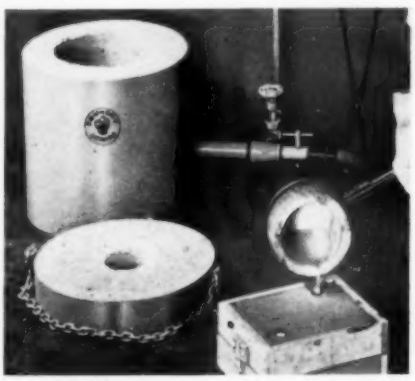
Imperial
INNER-LOCKED
BELTING

Imperial Belting Co.
1755 S. Kilbourn Ave., Chicago 23, Ill.
Engineered Belting—
The Right Belt for Each Job

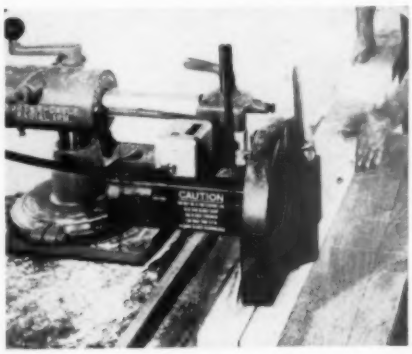
(Concluded from page 344)

20 ft. Capacity of smallest unit is two plates per day. Plates up to 18 x 24 in. flask size of any thickness can be produced or the equivalent in coreboxes, cope and drag plates, loose patterns for mounting, driers, flat plates, precision and experimental castings. Units include oven, furnace and compressor, and are said to be simply operated. Company supplies prints, sectional drawings, sketches, photographs and comprehensive explanations. Personal instruction is given if desired.

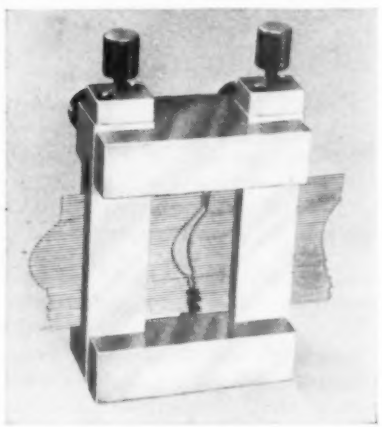
Miniature Foundry: Sawyer Bailey Corp., 785 Hertel Ave., Buffalo 7—Miniature foundry contains all equipment and tools necessary to produce sand and plaster mold nonferrous castings. Unit consists of furnace, crucibles, tongs, crucible holder, skimming and stirring rods, asbestos gloves and goggles. Molding equipment consists of a special grade foundry sand, flask, riddle, rammer and all other necessary tools. Furnace is a refractory lined welded steel shell capable of operating at 2400° F. Cover is of the same refractory, reinforced with steel bars. Burner handles manufactured, natural or bottled gas at pressures normally supplied to the home for cooking. Air may be supplied by a motor-driven blower or household vacuum cleaner. Furnace is designed to hold crucibles having a working capacity of 10 lb aluminum or 34 lb brass or bronze. Casting alloys and supplies adaptable to model building and experimental casting are available from the company.



Radial Saw: Porter-Cable Machine Co., 1714 North Salina St., Syracuse 8, N. Y.—High speed radial saw is offered in 1 or 2 hp ratings. Motor operates dc/ac, 25 to 60 cycles with spindle speed of 8000 rpm and is set vertically to accommodate cope heads, shaper heads, dado saws and groovers. Machine accommodates a 12-in. saw blade cutting a full 4 in. and is adaptable for cross cutting, gang cutoff, angle cutoff, bevel cutting, compound 45° cut, dado cutting and ripping operations. Saw can be set at any angle or depth desired. Cut-off capacity at 90° back fence is 20 in., at 90° front, 15½ in.; saw head raises 7 in.; maximum rip capacity to front fence is 21½ in., to back fence is 26 in. Table measures 17 x 46 in. and is 31½ in. from floor.



Gage: Thompson Products Inc., 23555 Euclid Ave., Cleveland 17—Contour transfer gage for measuring any radius or contour can be used to check die cavity contours and production line parts. It is designed to provide a means for reproducing many curves which are difficult to gage directly, in a readily measurable form. In conjunction with an optical comparator the gage permits a rapid, simple setup for checking dimensions. A dial indicator or height gage can be used if desired.



Paint: Lowebco Inc., 1525 East 53rd St., Chicago—Synthetic paint protects concrete surfaces with a corrosion-resisting finish that is said not to check, chip or peel. It dries to a hard, glossy finish in 3 to 4 hr and is said to be water repellent, to expand and contract freely with the material covered, to resist extremes of heat and cold and to resist abrasion.

Cast Iron

JACKETS

Are Best by Test

FREMONT MAGNESIUM FLASKS

ACCURATE.

STURDY...

LIGHT.....

BUILT FOR LONG SERVICE AND FAST PRODUCTION

GROOVLOCK

THE FOOL-PROOF PIN

THE FREMONT FLASK CO.

Fremont, Ohio

SOLIDIFICATION OF TIN BRONZES

(*Continued from page* 132)

it cut off. At the instant that the walls are completed, each cell will be full of molten metal which, upon freezing, will shrink in volume, leaving a small but definite void. If each cell in turn is likewise cut off from the feeding metal, the dendrite, when completed, will contain a regular network of such voids, similar to those indicated in Fig. 12. When solidification first occurs, the metal is weak. Stresses set up on cooling of the solidified mass may be sufficient to crack this weak metal, the crack following the path of the voids, thus resulting in those fissures which are the cause of leaks under comparatively low pressures.

The possibility of the formation of this continuous cellular structure is shown by Fig. 8 which is a micrograph of the lower part of the same riser, taken at a point where the dendritic formation was almost complete but where the remaining liquid had been withdrawn to feed the casting. Another excellent example of this cellular structure is shown in Fig. 10 of the article "Test Bars for 85-5-5-5 Alloy, Their Design and Some Factors Affecting Their Design" by G. H. Clamer.

A certain amount of porosity probably results from insufficient feeding of the interstices between the dendrites. During their growth, the tips of adjoining dendrites may grow together in such a manner as to shut off feeding from sections of the mold cavity further removed from the point of stoppage. The final solidification of the entrapped metal would necessarily result in voids or even in the massive type of shrinkage. This stoppage of feeding is probably the cause of centerline shrinkage commonly found in steel castings. Such voids, however, should not be sufficiently numerous in well fed castings as to cause the overall porosity ordinarily experienced in the bronzes.

Methods of Prevention — Having developed a theory to explain the cause of interdendritic shrinkage, it will be advisable also to develop, insofar as possible, methods of overcoming it. If the foregoing explanation of the cause is correct, in that shrinkage and the resulting porosity in the tin bronzes is caused by an inherent tendency for the alloys to crystallize with a cellular structure which is likely to result in locked-in voids, then any method of preventing these voids will lie, not in changing the structure of the dendrite—which would be impossible as long as we retain the present specified composition—but in employing foundry techniques or combinations of techniques which will permit complete feeding of the cubical cells before they have sufficient opportunity to form completely, or by obtaining sufficient pressure to actually break the retaining walls and permit liquid metal to fill the potential voids, and to retain this supply of liquid as long as the solidification is progressing.

Weak Below Solidification Point

It is known that just below the solidification point, tin bronze is comparatively weak. One indication of this weakness is the fact that the usual Williams riser commonly used with steel castings, cannot be used with bronze unless the top of the riser is placed above the top of the casting; otherwise the sides of the casting itself will be forced inward by the vacuum produced by the solidification of the riser. On the other hand, when these risers can be used successfully with bronzes, it is usually not necessary to provide the *firecracker* core because the walls of the riser are sufficiently weak to be broken through by the vacuum within, caused by the feeding requirement of the casting. Fig. 11 is another example of the weakness of newly solidified tin bronze. This illustration is a radiograph of a section of a chill cast ingot. It will be noted that the flow of metal past the dendrites was sufficient to break them in the direction of the metal flow and produce a chevron-like structure.

When the dendritic growth has become sufficiently advanced that complete cells have formed, these cells will at first be completely filled with liquid metal. Upon solidifying within the cells, this metal will occupy a smaller volume, resulting in the formation of a vacuum within each cell. If sufficient pressure can be applied to the metal immediately outside the cells, it should be possible to break the weak membraneous walls and permit each cell to fill completely with metal. Once a wall has been broken, the constant inflow of metal resulting from the reduction in volume upon solidification will permit the cell to become filled with solid metal. The feeding action may be instituted before the cell becomes completely closed, in which case the constant inflow will prevent further building up of the wall and complete feeding of the cells should be obtained.

The evident problem then is how to obtain this necessary pressure to

(*Continued on page* 350)

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(*Continued from page* 348)

force the molten metal between the axes of the dendrites and into the cells. Tests conducted at the Naval Research Laboratory indicate that ordinary atmospheric pressure is sufficient to insure complete feeding of the bronzes, provided that this atmospheric pressure is available throughout the time that the casting is solidifying.

The attainment of complete feeding will depend upon correct design of the casting, correct positioning of the mold cavity and correct gating and risering, but all of these will be ineffective in providing the necessary *feeding unless the risers are kept open to the atmosphere as long as any liquid metal remains in the mold cavity.* From the author's experience, this last and most important item has probably been given the least consideration in the nonferrous foundry of any item of foundry technique. Most steel foundries use riser compound on open risers to keep them in a molten state until the casting has solidified; or make special provisions to provide continuous access to atmospheric pressure. To make the same provision in bronze and other nonferrous alloys is a little more difficult. Any compound which is used for this purpose must be such that it will not make any appreciable change in the composition of the riser, and must not add any harmful effects which would show up later when the risers are remelted.

Use Gypsum Sleeve

To date, probably the most effective riser insulation for most nonferrous alloys is the gypsum sleeve combined with powdered gypsum on the surface of the riser which was developed by the Naval Research Laboratory.[2] While this method has been found very effective for most copper-base alloys, it is not suitable for monel metal and other high nickel alloys because of interaction between the nickel and the sulphur in the gypsum. It is the author's opinion that the development of a purely mechanical riser sleeve is a fertile field for research, especially to develop one which will be suitable for all metals, which will be a highly efficient insulator, can be purchased in standard sizes for various shapes of risers, will not react with the metal, and which will not harm the sand in the shakeout. This is a rather large order but should not be impossible.

Another possibility is the use of the exothermic type[3] of riser compound. Such exothermic compounds may be divided into two classes: (a) Thermit compounds which produce a large amount of very hot metal of the same composition as that of the casting which has been poured, placing this hot metal directly in the riser where it will have the maximum effect in supplying the necessary feeding, and (b) compounds which by a chemical reaction within themselves produce sufficient heat to keep the risers in a molten condition until the feed demand has been met.

A third possibility is the use of induction currents produced by surrounding the riser with an electric coil through which a primary current is passed and which in turn induces a secondary current in the riser, and which is sufficient to keep the riser molten until the casting has solidified.

Regardless of the method by which it is accomplished, the risers must be kept open to the atmosphere in order to produce castings free from porosity. If the riser is allowed to freeze over, the only pressure which remains for feeding is the weight of the liquid metal which is not sufficient to force the liquid between the clusters of dendrites, let alone breaking down the cellular structure. Once a riser becomes frozen over, it has no further value as a feeding agent and in many instances may be a detriment in that there will be a liability that the riser will draw metal from the casting.

Effect of Pouring Temperature — When considering the effect of metal temperature, it should be kept in mind that dendritic growth takes a certain period of time. All other things being equal, the longer the time of solidification, the larger will be the dendrites, the more branches will be formed, and the greater will be the opportunity for the formation of cells. If these cells can be kept from forming and excessive branching prevented, then there will be little opportunity for the formation of voids, providing the metal is free from gas and sufficient pressure is applied to the surface to force the still molten metal between the branches. Proof of this statement is indicated by the fact that chill cast bronzes which are very fine grained and show no traces of dendrites in the fracture, seldom leak under pressure.

The obvious answer then to the problem of preventing excessive dendritic growth is to pour the metal at as low a temperature as possible. The author can make this statement with complete assurance, since about half the cases of leakage with which he has worked have been corrected by lowering the pouring temperature. There appears to be a tendency to

pour bronzes hotter than necessary, usually with the thought that it is necessary to pour hot in order to run thin portions of the castings, especially if these thin portions cover a considerable area. It has usually been possible, however, to run these castings with metal considerably cooler than thought possible and by this method alone to correct a large proportion of the trouble with leakers. Therefore, bronzes should be poured at as low a temperature as possible, at a temperature sufficiently low that the metal farthest removed from the gates and risers begins to solidify before the mold is completely filled.

To accomplish pouring at these low temperatures, it is often necessary to use a system of multiple gates spaced at suitable intervals around the casting. This is preferable to raising the temperature of the metal to enable the pouring of castings with large areas through single gates.

ACKNOWLEDGEMENT. Grateful acknowledgement is made to personnel of the Naval Research Laboratory and of the Boston Naval Shipyard for supplying the photographs, micrographs and radiographs used in this article.

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3. "Exothermic Materials" by C. G. Lutts, J. P. Hickey and Michael Bock II, *American Foundryman*, August, 1946.

Note—The opinions expressed herein are those of the author, and not necessarily those of the Navy Department.

Publishes Yearbook

Foundry Equipment Manufacturers Association recently has published its annual yearbook under the heading "Our 30th Year." This interesting publication describes the work of the F.E.M.A., and lists the objectives of the association and by-laws. It includes the various committees, the membership roster and the other pertinent data. It also carries the report of the president which was presented at the annual meeting in 1947 and presents a number of photographs taken on the occasion of the meeting.

Foreword in the publication points out that the F.E.M.A. numbers approximately 60 manufacturers who represent approximately 80 per cent of the foundry industry's source of basic equipment.

Offices of Arthur J. Tuscany, executive secretary of the association, are located in the Engineers Building, Cleveland 14, O.

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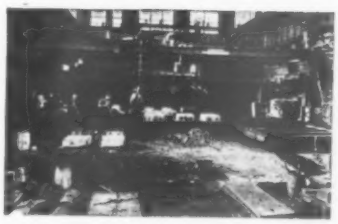

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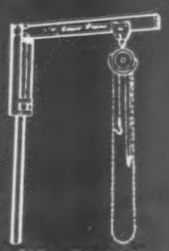

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ALUMINUM ALLOY CASTINGS

(*Continued from page* 145)

however, greater care must be exercised to assure that green sand cores will be amply supported in the mold. Parting lines should be carefully located to facilitate molding.

Cores should be as simple as the design of the casting will permit, and deep pockets or small recesses should not be used. Long thin cores are easily broken and therefore should not be used. Wherever possible, the design should be such as to eliminate projecting or overhanging parts that might be washed away by the molten metal. A design requiring two-piece or multipiece sand cores resulting in fins on the casting should be avoided, especially if the fins cannot be removed.

For simplicity in handling, it is desirable to design cores so they can be dried on a flat surface. Where complicated cores that cannot be handled in this manner are necessary, core driers should be specified in order to avoid sagging and warping during handling and drying.

Provide Adequate Core Prints

Core prints must be large enough to provide adequate support for the cores and to permit the escape of gases developed during pouring. They must also be large enough to permit removal of any chills or strengthening wires used. In some cases, especially in castings that must be pressure tight, additional core prints are needed to provide adequate openings for the escape of mold gases. Openings in casting walls made by core prints may be closed by any one of several methods. Where core prints are necessary in highly stressed sections, a bead around the hole is recommended to compensate for the loss of section area.

Chaplets may be used to support cores when necessary but should be avoided wherever possible, especially in castings that must be pressure tight. In thin sections, either aluminum or steel chaplets may be used. In thick sections, or with heavy cores, steel chaplets may be required to provide the necessary support.

In permanent mold casting, the design must be such that the metal cores can be withdrawn from outside the mold and the casting itself removed from the mold. Complicated parts with recesses so intricate that metal cores cannot readily be removed may require the use of sand cores (semipermanent mold method) or split cores and multiple-piece molds. These are quite satisfactory from the standpoint of casting quality, but are more expensive and the production time per casting is higher. Often the design of the casting can be changed to simplify both the mold design and the coring and thus lower the production cost.

Undercuts are troublesome in both sand and permanent mold casting, and in permanent mold casting they require multiple-piece cores. Where undercuts cannot be avoided, openings wide enough to allow removal of collapsible cores must be provided. Although the use of collapsible or multiple-piece metal cores, or of sand cores, results in higher cost, their use makes it possible to cast pieces in metal molds that otherwise would have to be sand cast.

Hard metal inserts are often used in aluminum castings at points subject to excessive wear or stress. These are usually cast iron or steel, but copper or brass may be used if properly protected to prevent their solution in the molten aluminum. Keyed inserts sometimes are used where high torque must be transmitted from a shaft to a rotating aluminum part. The heating elements of electric irons and hotplates also are often cast in place. Small-diameter passages for oil or other fluids which, because of their size or curved direction, could not be cast or formed by machining, can be provided by casting small-diameter copper tubing into the walls of aluminum castings.

Because of the difference in thermal expansion of the insert metal and aluminum, special care must be exercised to minimize stresses resulting from solidification and contraction. Some inserts must be preheated and inserted in the mold hot. Preheating to drive off surface moisture and oil, and sandblasting to remove surface scale, helps to prevent blows. Placing risers near the inserts also helps, as the inserts act like chills and cause the metal near them to solidify rapidly.

Sufficient metal must be provided around inserts to prevent cracks from contraction stresses during solidification. Inserts should be knurled, grooved or keyed so as to provide good mechanical retention under service conditions. Large inserts may be slotted where contraction stresses must be held to a minimum.

Pattern Equipment—Equipment for sand casting aluminum is in general similar to that used for other metals, except for differences in shrinkage allowance, gating, and section thickness to compensate for differences in mechanical properties. Choice of pattern equipment is an important factor

in determining the production cost of a given casting. The advice of an experienced foundryman is a valuable guide in this consideration.

Loose wood or metal patterns, cope and drag patterns of wood or metal, and matchplates are among the pattern equipment available to the aluminum foundryman. Wood or aluminum patterns may be faced with steel or provided with steel inserts to reduce wear from abrasion. Selection of equipment for a specific casting will depend on the size and shape of the piece, required tolerances and the number of pieces to be produced, as well as economic considerations.

Gated patterns, cope and drag equipment, and match plates are useful for large production runs. These patterns themselves are often cast in aluminum. For small castings, the metal matchplate is particularly advantageous as several patterns, suitably interconnected with a single gating system, may be combined into a single unit.

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Editor's Note: Concluding discussion of aluminum casting design will be presented next month. Subsequent articles will cover permanent mold practice, trimming, machining and finishing, heat treatment, and inspection and quality control.

Book Review

ASTM Standards on Copper and Copper Alloys, paper, 463 pages, 6 x 9 in., published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3. Price $4.

Containing 99 standards, of which 16 deal with castings, this volume brings together only those standards relating to copper and its alloys which have been prepared by the American Society for Testing Materials. Other standards relate to copper and copper alloy wire and cable; plate, sheet and strip; rods, bars and shapes; pipe; die castings; and nonferrous metals.

In addition about 140 pages of the book are devoted to methods of testing copper and copper-base alloys. These include expansion of tubing, mercurous nitrate test, preparing casting specimens, resistivity, preparation of micrographs, etc.

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WELDING PROCEDURES: Eutectic Welding Alloys Corp., 40 Worth St., New York 13—Bulletin sets forth practical procedures for salvaging cast iron, bronze, aluminum and malleable iron castings. How to seal leaks and cracks, treatment of complicated light and heavy castings, and the application of special alloy welding rods for application at low base metal heat are discussed.

MACHINING ALUMINUM: Apex Smelting Co., 6700 Grant Ave., Cleveland 5—Reprint, "Machining Cast Aluminum Alloys," discusses the overall problem of machining cast aluminum alloys and deals specifically with such items as tool shapes and materials, cutting compounds, cutting speeds, lathe practice, milling, shaping and planing, and drilling. Bibliography on working and machining aluminum alloys is included.

FANS: Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30—Booklet B-3804 describes and illustrates elbow or straight-through type fans suitable for high temperature applications in air conditioning systems, heating and ventilating, dust and fume removal, equipment and machinery cooling, heat treating nonferrous metals, and industrial drying and processing.

CONCRETE AGGREGATE: Walter Maguire Co. Inc., 330 West 42nd St., New York 18—Bulletin 701 is an educational treatise on aggregate—that combined mass of mixed materials used with cement and water to make concrete. It contains recommendations of the leading cement companies and the Portland Cement Association for good aggregate and shows comparative strength analyses.

TRUCKS and TRACTORS: Clark Equipment Co., Tructractor Division, 258 Champion St., Battle Creek, Mich.—*Material Handling News* discusses the company's integrated manufacturing process and features most of the major units that go into its fork trucks and tractors, including electric steel castings, wheels, axles, transmissions, gears and forgings.

UTILITY MACHINE: Wayne Crane Division, American Steel Dredge Co. Inc., P. O. Box 570, Ft. Wayne 1, Ind.—Catalog 406 describes a one-man operated, rubber-tired machine serving as a 5-ton crane, ½-yd clamshell, ½-yd dragline, ½-yd power shovel or ½-yd trench hoe. Operating and specification data are included.

PRODUCTION CONTROL: Remington Rand Inc., Tabulating Machine Division, 315 Fourth Ave., New York 10—Booklet is divided into four sections—engineering, planning and materials control, scheduling and progress—which describe procedures for keeping management informed of plant operations. Objectives of methods described in the booklet are: Realistic planning, efficient machine loading, minimum inventory investment and full utilization of facilities. Booklet outlines steps for installing a punched-card production control system.

GAS MASKS: Acme Protection Equipment Co., 3037 West Lake St., Chicago 12—Series of illustrated bulletins present a wide range of gas mask protection equipment for use in hazardous gas and smoke atmospheres. Information is provided on the proper canisters to use for smokes, fumes, mists, organic vapors, acid gases, ammonia, etc., in a table which provides a list of gases with equipment recommended.

MAGNETIC SEPARATORS: Dings Magnetic Separator Co., 4708 West McGeogh Ave., Milwaukee 14—Bulletin 1120 describes operation of the company's laboratory in solving separation problems in many industries. Purpose of the laboratory, whose service is free, is to analyze materials to determine if, and how best, they can be magnetically separated and to develop new and improved separators.

ELECTRODES: Ampco Metal Inc., 1745 South 38th St., Milwaukee 4—Bulletin W-17 contains illustrations and information on how to weld a wide variety of alloys using bronze arc welding electrodes. A chart is included listing alloy types, specifications, chemical compositions, physical properties and weldability values of the company's bronze electrodes.

LATHE: Divine Brothers Co., 200 Seward Ave., Utica 1, N. Y.—Bulletin VCSV-1 and price list covers a variable speed lathe for buffing and polishing operations. Lathe has speed adjustment allowing for compensation of loss of diameter of the buff or polishing wheel without sacrificing efficiency of the correct surface speed.

VALVES: Edward Valves Inc., 1200 West 145th St., East Chicago, Ind.—Catalog describes forged steel chrome-molybdenum valves suitable for service from 1500 to 2500 lb at 1000° F. Details of construction, dimensional and design data, material specifications and other data are included.

GRINDER — Corlett-Turner Co., 1001 South Kostner Ave., Chicago 24—Leaflet describes the company's grinder for small tool grinding, deburring, buffing, polishing and other applications. Numerous photographs illustrate typical applications.

PHOTO PAPER: Eastman Kodak Co., Industrial Photographic Division, 343 State St., Rochester 4, N. Y.—Pamphlet describes a sliver sensitized paper for use in normal room illu-

mination with standard blueprint or direct process printers for producing a high-contrast positive copy directly from a positive original. Problems of reproducing opaque drawings, worn, stained, or discolored tracings, or direct process prints or blueprints are discussed.

ROLLER BEARINGS: Link-Belt Co., Ball & Roller Bearing Division, 519 North Homes Ave., Indianapolis 6—Book 2196, dealing with radial thrust, self-contained, preadjusted roller bearings, contains tables of dimension, weights, bearing capacities at given revolutions per minute, shaft fit tolerances, housing fit tolerances, and the necessary data for calculating the required bearing capacity for different types of machinery.

HAND TRUCKS: Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24—Bulletin describes and illustrates the operating mechanisms and specific details of each of the company's line of battery-powered hand trucks. Rectifiers and motor generator chargers for charging batteries also are described, and photos of the trucks in use are shown.

CONTROLLERS: Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44—Catalog ND44(3) lists specifications in tabular form for all Model C indicating controllers. Illustrations show installation and interior views of these instruments, and, in addition, the standard ranges for which these instruments can be supplied are listed.

SCREENS: Robins Conveyors Divison, Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.—Bulletin 122-A gives a condensed explanation of the two-bearing circle-throw principle employed in the company's vibrating screens. Full range of sizes in single or double deck styles are listed. Service illustrations are shown.

ADHESIVES: Minnesota Mining & Mfg. Co., 901 Fauquier Ave., St. Paul 6—Illustrated brochure provides research help for industrial customers in choosing the right adhesives, sealers and coatings. It contains 40 pictures, 18 case histories and lists 26 of the more than 1000 adhesive formulas offered by the company.

ANNEALING: Ajax Electric Co. Inc., 1108 Frankford Ave., Philadelphia 25—Bulletin 121 describes the cyclic annealing of castings and other metal products in electric salt bath furnaces. Bulletin 120 discusses martempering, austempering, and combined carburizing and isothermal treatment.

ELECTRICAL EQUIPMENT: Motor Generator Corp., Box DM-785, Troy, O.—Folder reviews the company's products, including: Motor generators in capacities from ½ to 20 kw, metal plating equipment in sizes from 5 to 20 kw, metal coloring and finishing equipment, materials handling equipment, electroplating,

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To secure effective fluxing and to bring all impurities to the surface we have developed compound fluxes which do not absorb moisture from the air; they do not smoke or create fumes; your skimmings will be in powdered form with little metal if skimmer is riddled off.

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reduced scrap
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IN GOVERNMENT USED EQUIPMENT

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POURING LADLE, Lip Type
Manufacturer—Swindell Dressler Corp., 1942
Serial—1957K2
Rated capacity—5000 lbs
Size—84" OD x 66" ID x 44" high
Manually operated

FURNACE, Heating Aluminum Stock
Manufacturer—Morrison Engineering Co.
Rated capacity—500 lbs. per hour
Size—6' 9" dia. x 6' 3" high
Gas fired

FURNACE, Box Type
Manufacturer—Lindberg Engineering Co.
Serial—183618-AS
Size—3' 8" dia. x 7' 10" high
Heating range—up to 2050° F

FURNACE, Heat Treating, Electric, Box Type
Manufacturer—C. I. Hayes, Inc.
Type—LB 120-SRA 86353.
Size—37½" W x 28¾" H x 92" L
With motors, 230V, recording controls

FURNACE, Electric, Box Type, Hardening, Certain Curtain
Manufacturer—C. I. Hayes, Inc.
Type—LB-1205 RA
Size—72" L x 36" W x 24" H
With motors

QUENCHING PRESS, Vertical, Air Operated (5)
Manufacturer—Gleason Works
Serial—18484, 22231, 21282, 21281
15" max. dia. of work
17" stroke
1—serial 19122
25" dia.

POWDER SPREADING MACHINE with Boston Ratiomotor
Manufacturer—S. K. Wellman Company
Serial—VMD 2836 W
With motor 220/440 V ¼ HP

DRY ARRESTOR or GAS COLLECTOR
Manufacturer—American Filter Company
Rotoclon Model #16
Serial—7159
Rated capacity—18,000 CFM
With motors 550 V, 20 HP

DUSTING MACHINES, Dry Type (3)
Manufacturer—W. W. Sly Mfg. Company
Size—7' 10" H x 10' W x 12' 2" Front to back
Model—C 9876
With motors—220/440 V, 1 HP

OIL CLARIFIER, Hermetic
Manufacturer—DeSaval Separator Co.
Model—194-61
Feed pressure—95# max.
Discharge—15# min.
2¼" opening, feed and discharge
With motors—220/440 V 1¾ HP
1—10 HP and 1—3 HP

DEGREASER, Detrex Model 325
Manufacturer—Detroit Rex Product Co.
19' 6" L x 4' 4" W x 11' 8" H
With motors—220/440 V

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2432 West Third Street
CLEVELAND 13, OHIO

battery charges, electro-power units, buffers and grinders, air compressors, magnet service generators and aviation service equipment.

ROOF REPAIR: Stonhard Co., 403 North Broad St., Philadelphia 8—Folder describes a material for renewing dried-out roofs and for stopping leaks in roofs. Danger signs that lead to roof failure are described, and cut-away illustrations show the vulnerable points where special attention is most often required.

METALLIZING: Metallizing Engineering Co. Inc., 38-14 30th St., Long Island City 1, N. Y.—January issue of *Metco News* presents an article on machine element metallizing, a description of a light-duty metallizing gun which requires for air supply a 3-hp compressor, and describes a new bonding metal.

FOUNDRY PLANNING: A. A. Wickland & Co., 205 West Wacker Dr., Chicago 6—Brochure outlines considerations of all phases of operation to be made in planning a new foundry or modernizing an old one. Planographic reproductions of modern plants designed by the company are included.

FLOOR REPAIR: Smooth-On Mfg. Co., 570 Communipaw Ave., Jersey City 4, N. J., Dept. 17-C—The patching of cracks, ruts and shallow holes in concrete floors is shown and described in new leaflet. Another leaflet describes a compound for sealing leaks in concrete, brick or stone walls and floors.

HOOKS: Downs Crane & Hoist Co., 540 West Vernon Ave., Los Angeles 37—Bulletin 200 contains information and illustrations of hooks, tongs, grips and slings for handling heavy loads. Construction features, capacity ratings, safety factors and specifications are shown.

STEAM TURBINE—Whiton Machine Co., 190 Howard St., New London, Conn.—Booklet on solid rotor type steam turbine shows engineering features, drawings and dimensional data useful in selecting the size and type turbine needed for specific applications.

HEADBAND: Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8—Bulletin CE-15 describes a sponge rubber headband which is designed to absorb perspiration, preventing it from dropping into the eyes and on glasses or goggles.

JACKS: Templeton, Kenly & Co., 1220 South Central Ave., Chicago 44—Bulletin "Tank 48" covers screw type jacks for supporting and leveling tanks for outside applications. Illustrations, specification charts, selection guide data and price listings are included.

WELDING EQUIPMENT—Tweco Products Co., P. O. Box 666, Wichita 1, Kans.—Booklet 1948-T describes and illustrates the company's line of welding electrode holders, ground clamps, cable connectors, machine terminal, cable splicer, lugs and carbon holders. Price and parts information is included. A 2-page bulletin, "Causes and Cures for Hot-Running Welding Cables and Connections," also is offered.

ELECTRODES: Welding Equipment & Supply Co., 223 Leib St., Detroit 7—Literature lists the following company electrodes, their properties, recommended uses and procedures for application: Pure nickel, copper-nickel, "Drawalloy," heat resisting alloy, bronze and copper.

GRINDERS: Hammond Machinery Builders Inc., 1600 Douglas Ave., Kalamazoo 54, Mich., Dept. GP-37—Catalog 220 illustrates and provides information and specifications for the company's wet and dry carbide tool grinders, chip breaker tool grinders and diamond finishing tool grinders.

MATERIALS HANDLING: Mercury Mfg. Co., 4044 South Halsted St., Chicago 9—Catalog 7-11 deals with the company's line of fork trucks, lift trucks, tractors and trailers. Special attention is given to a fork truck "trackless train" system of material handling.

TESTING MACHINE: Steel City Testing Machines Inc., 8843 Livernois Ave., Detroit 4—Catalog describes a brinell testing machine capable of checking up to 800 pieces per hour of parts varying in diameter and thickness as much as ¾ in. without moving the elevating screw.

SANDERS: Freeman Supply Co., 1152 East Broadway, Toledo 5—Four-page illustrated folder covers disc and spindle sanders for the wood or metal pattern trade. Special features are described along with complete specifications and prices.

WIRE ROPE: Macwhyte Co., Kenosha, Wis.—Booklet 48-1 shows the processes of manufacturing wire rope from wire rods through wire and rope mills. Story is presented in pictures with short captions in a manner similar to a strip film.

VALVES: W. S. Rockwell Co., 200 Eliot St., Fairfield, Conn.—Bulletin 500 describes and illustrates company's slide valves, butterfly valves and automatic and power-operated valves. Tables of dimensions and cut-away drawings are included.

TRANSFORMERS: Allis-Chalmers Mfg. Co., 1126 South 70th St., Milwaukee 1—Bulletin 61B6159A describes company's line of distribution transformers, 100 kva and below, 15,000 v and below. Booklet contains mechanical data and prices.

TACHOSCOPES: O. Zernickow Co., 15 Park Row, New York 7—Circular covers two models of the company's speed measuring instruments. One measures rpm and fpm, the other rpm only.

PYROMETERS: Illinois Testing Laboratories Inc., Rm. 511, 420 North LaSalle St., Chicago 10—Bulletin 4434 contains descriptive literature and prices on the company's portable pyrometers.

See M·S·A's Exhibit
AT THE FOUNDRY SHOW
Booth No. 118

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HEADQUARTERS

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For every foundry dust and fume hazard . . . M.S.A. Dustfoe and Comfo respirators . . . all U. S. Bureau of Mines-approved for protection, and built for easy wearing comfort on the job.

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Fast, simple Carbon Monoxide determination, without special training! Measures CO content of air by color change in chemical tube. Accurately indicates CO in air from 0.001 to 0.10 per cent by volume.

M·S·A BLASTFOE

This modern Abrasive Helmet features loose-fitting, positive-pressure design for new sand-blasting comfort. Weighs less than 4½ lbs.; U. S. Bureau of Mines-approved.

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CAN HANDLE IT

Acme has the complete facilities to handle your entire pattern job with faster deliveries, greater efficiency. Typical large job is that illustrated above—cope and drag aluminum pattern equipment for diesel engine alternator stator frames. Cope half was machined in one piece; drag half machined in 8 sections and assembled on drag plate.

• Acme can take the complete assignment—any size or any quantity—from raw idea to finished castings. Make Acme your source for cope and drag plates—core boxes—match plates—precision castings in aluminum, brass, and bronze —etc. Our 18th year as pattern specialists.

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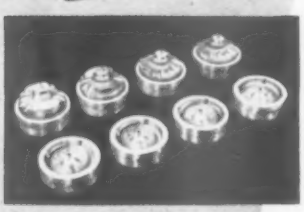

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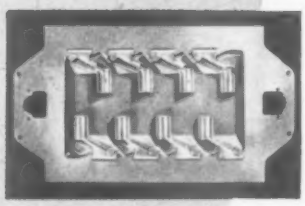
Completely machined brass cope and drag pattern inserts for motor end frames. Hi-accuracy permits interchangeability.



Aluminum Match Plates

Single or multiple sections from one master pattern. Precision cast. Low clean-up time.

SEND BLUEPRINTS FOR PROMPT QUOTATIONS

PATTERNS by Acme
ACME ALUMINUM ALLOYS, INC.
202 N. Findlay St., Dayton 3, Ohio

Cut time losses . . . reduce spoilage . . . increase production

You can imagine the effectiveness of an "open roof" like the above on your glass plant, foundry, heat-treatment room or other large heat-producing operation. Swartwout AIRMOVER covers thousands of square feet of industrial roofs, gives heat, smoke, fumes and dust easy passage through efficiently designed parallel openings. Dampers provide full or partial closing when desired, but ventilator system is weatherproof at all times.

AIRMOVER is made in units which "add together" to make runs as long as necessary. Parallel runs make possible practically total roof coverage. Ventilator is only 32" high—doesn't add unmanageable weight to your roof.

Swartwout Ject-O-Valve does a real job *where power ventilation is needed*

Over vats, furnaces and other *concentrated* heat spots you can profitably use this powerful "straight-through" powered Ject-O-Valve. Made in sizes and capacities to fit your need.

Swartwout new catalog describes full line of gravity and power roof ventilators. Ask for Bulletin 324.

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Swartwout *Controlled* **Air Circulation**
EQUIPMENT FOR EFFECTIVE ECONOMICAL VENTILATION OF INDUSTRIAL BUILDINGS

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THE paddle-type mixer for core sand mixing in the foundry. Blystone Mixers offer: low mix cost, thorough mixing, and easy operation. There is a sturdily built type and size for your problem. Send for Bulletin and full details.

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STANDARD SAND & MACHINE CO.
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FASTER AND BETTER
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MURPHY PISTOL SPRAYER
ELIMINATES SWAB, BRUSH and SPRAY CAN

BLACKENING REACHES HIDDEN POCKETS
MOLDS ARE BLACKENED FASTER
CASTINGS PEEL BETTER
WORK COMES CLEANER
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PRICES COMPLETE WITH SUCTION HOSE AND SINKER

PIPE SIZE	1/16"	1/8"	1/4"	3/8"	1/2"
PRICE F. O. B. HAMILTON, O.	$12.00	$12.00	$12.00	$14.50	$18.00

Used for Silica wash, oil, water or any liquid material. For sand-blast cleaning. As a blow gun for cleaning motors and machinery. If your dealer cannot supply you at once, order direct from manufacturer below. Literature on request.

GUARANTEED COMPRESSED AIR PRODUCTS

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Moisture Elimination Up To 3000 Pounds Per Square Inch

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Prove to your own satisfaction by *actual trial*, what hundreds of foundries have discovered . . . that you get better cores at lower cost by using DAYTON CORE OIL. As a result, you get cleaner, more uniform castings. Our representatives are trained by years of experience to help you solve your core production problems. Order a drum of Dayton Core Oil . . . test it! We believe you'll want to use it exclusively thereafter.

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MAKERS OF DOCO BINDER & CORE PASTE • DOCO STEEL CORE & MOLD WASH

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WITHOUT EXCESSIVE WEIGHT
Assures Efficient Truscon Steel Flask Performance

Dead weight does not necessarily mean high strength in flasks. Truscon Steel Flasks are carefully engineered for maximum strength without superfluous weight. The proper thickness of steel is used in every flask wall, and the wall is so shaped that it has unusual strength and rigidity for its weight. This assures long service under extreme conditions, and easier handling. Write for illustrated catalog on Truscon Steel Flasks.

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SAVES many times its cost for general foundry problems involving cupola, molding, metal composition and mechanical properties of cast iron, steel, aluminum, bronze, etc.

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Revolves on Retainer Pin.
Cutters revolve against hex bushing shoulders,
NOT SOFT CASTING
HARDENED HEX BUSHINGS
Pressed into casting, absorb radial thrust — cannot turn.

Exclusive ON VINCENT-HUNTINGTON GRINDING WHEEL DRESSERS

Vincent Dressers are built to *stand up* longer on snagging wheel and other tough dressing operations. All radial thrust and side friction is absorbed by hardened hexagon bushings . . . not soft casting of dresser. Dresser wear eliminated.

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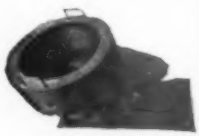
CENTRIFUGAL CASTING MACHINES

Model AS

These machines used to make ferrous and non-ferrous centrifugal castings are produced by the pioneer manufacturer of such equipment.



Model J

They are made in a large variety of styles and a wide range of sizes. Complete technical information is supplied concerning sand and permanent mold design, gating, sand mixes, speeds, etc.

Model M

Send us drawings or sketches of parts you are interested in casting centrifugally, and we will tell you, without obligation, if and how our machines can cast them faster, cleaner and with fewer rejects.

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MELTING POTS—Ingot Molds

for ALUMINUM AND OTHER NONFERROUS METALS. 45 SIZES.

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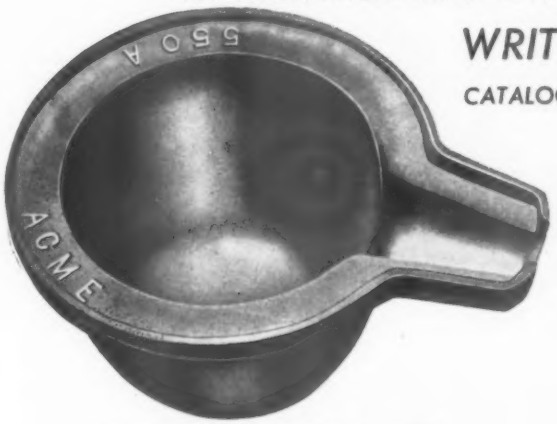
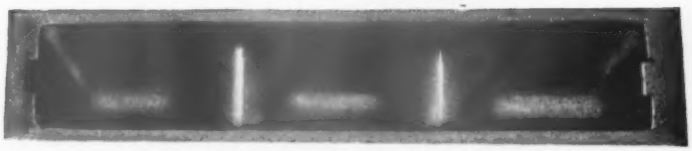


ROUND SPOUT POT NO. 550A
WITH 1½" COLLAR ON FLANGE

HOLDING——→
BOWL NO. HP7001



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Made of Acme SPECIAL-M-Heat Resisting Iron — They Stand the Heat!

ACME FOUNDRY COMPANY

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★ ***Gives over a half ton of aereated, fluffed and properly conditioned sand per minute and eliminates the burdensome task of hand-shovelling the sand heap. THE BRUSH DOES THE JOB.***

This *different* conditioner propels itself over the heap as thousands of tempered steel wires revolving at high speed pick up each particle of used sand, added bond and moisture and blend them thoroughly.

It breaks down the sand lumps, distributes the new sand and bond and moisture with the old sand, leaving the blended heap sand *light and fluffy.*

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SAND CONDITIONING EQUIPMENT

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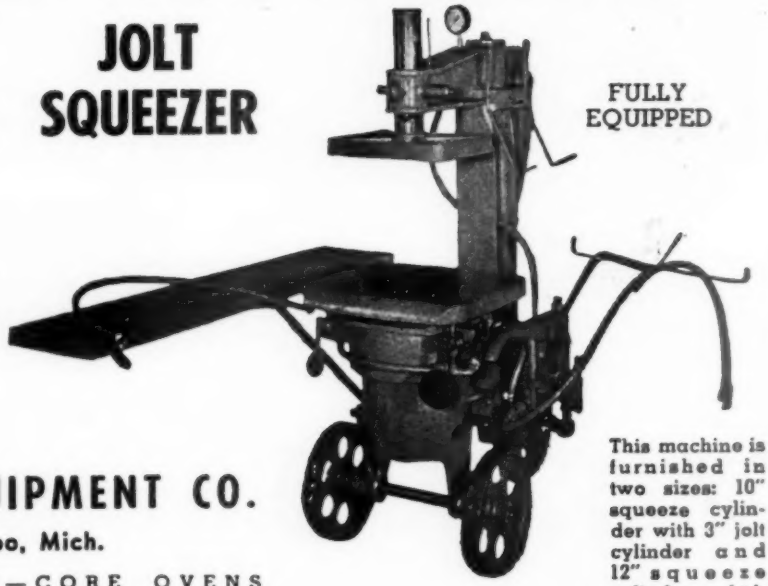
HAYNES EQUIPMENT

JOLT SQUEEZER

FULLY EQUIPPED

● The post and squeeze cylinder on the HAYNES JOLT SQUEEZER is cast all in one piece. There are no bolts or screws in this machine. The top of the post is machined on top with a 2 7/16" cold rolled shaft which the swing arm swings on.

This is a portable machine with three wheels, two in front, one in back, zerk fittings on all moving parts. Comes equipped with air gauge, pop-off gauge and a pin on top of the arm for a gate horn.



This machine is furnished in two sizes: 10" squeeze cylinder with 3" jolt cylinder and 12" squeeze cylinder with 4" jolt cylinder.

HAYNES FOUNDRY EQUIPMENT CO.

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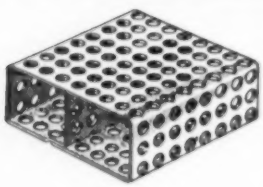
LADLES—BRASS FURNACES—CORE OVENS

CHAPLETS



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Ideal for *gas burner* work and numerous other foundry applications where perfect ventilation is required. Gives core support over wide area. Available in a multitude of shapes, sizes, and in metal to suit any requirement.

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See this Lathe and 9 other pattern making machines in our exhibit at the A.F.A. Convention in Philadelphia

This fast, accurate "Oliver" Wood Turning Lathe features a new principle. The stationary plate carries permanently contact plugs which are fastened to all the motor wires. All power is shut off from the controller while the handwheel locates the sliding plate at any one of the four speeds desired. Made in three sizes to swing 16, 20 and 24 inches. See the Lathe at the Convention, or write for Bulletin No. 25.

OLIVER MACHINERY COMPANY

Grand Rapids 2, Michigan

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AMASTEEL

GENUINE ALLOY STEEL
SHOT

LASTS MANY TIMES LONGER

Here at last is peak efficiency in Shot for blast CLEANING and PEENING. AMASTEEL SHOT is far better than ordinary hard iron abrasives because it is TRUE ALLOY STEEL.

Compared to regular blasting materials, AMASTEEL offers an amazing superiority due to its long life and resistance to breakdown and greater CLEANING and PEENING speed. This feature means additional savings on labor, handling, storage, freight costs, and dust disposal.

AMASTEEL is produced under exclusive patents and is available in sizes that meet all CLEANING and PEENING requirements.

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CLEANBLAST
ALLOY 99

ALLOY METAL ABRASIVE CO.

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2nd to none...

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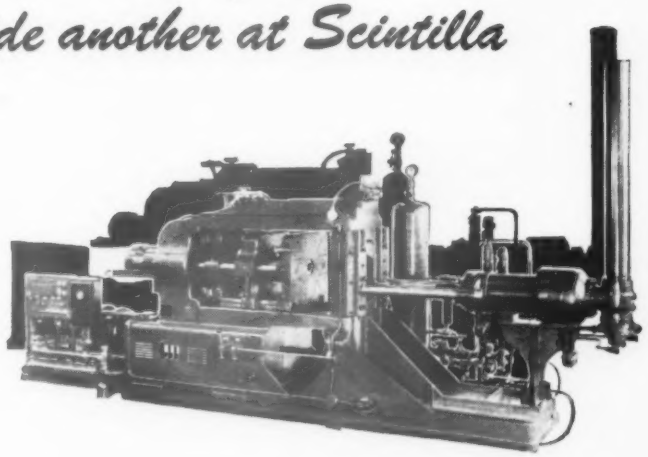
WE at Lester-Phoenix are proud that so many of our customers have more than one of our die casting machines in operation. At the Scintilla Magneto Division, Bendix Aviation Corporation in Sidney, New York, the first Lester-Phoenix die casting machine proved so successful in performance, that a second one was soon placed in operation beside it. That is one of the concrete reasons for making the claim: Lester-Phoenix die casting machines are *second to none.*

Complete data on aluminum-magnesium-brass models or zinc-lead-tin models will be furnished on request.



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LESTER-PHOENIX
DIE CASTING MACHINES

OUR BELT MACHINES are built in lengths 12 to 24 ft. with or without cleats —TROUGH or FLAT. Very efficient for handling slack, pea and nut coal, coke, sand, gravel and other loose material.—We use the best rubber belts obtainable.

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THE GODFREY CONVEYOR CO., INC.
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JISCO

SILVERY PIG IRON

A BLAST FURNACE PRODUCT

Smelted from Superior quality lake ores, high grade metallurgical coke and limestone, using our own local No. 1 Sharon Seam coal.

A "blend" with JISCO is sound metallurgy.

HIGH SILICON IRON JISCO

THE JACKSON IRON & STEEL *Company*
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BOOTH 111
EXHIBIT HALL

A. F. A. FOUNDRY CONGRESS
PHILADELPHIA—MAY 3-7, 1948

Sold Exclusively by
REPUBLIC COAL & COKE CO.
8 South Michigan Ave., Chicago 3, Illinois

BRANCHES: Peoria • New York • Indianapolis • Milwaukee • Minneapolis • St. Louis
Detroit • Cleveland • Cincinnati • Evansville
Manufactured at Terre Haute, Indiana by INDIANA GAS & CHEMICAL CORPORATION

Why Morton's Salt Tablets to fight "heat fatigue"?

You know, of course, that salt tablets at every drinking fountain are a must in modern plants. For years, industrial physicians and safety engineers have recommended salt tablets as low-cost insurance against the loss of efficiency and man-hours that "heat fatigue" causes. But it is vitally important that workers **accept** the salt tablets you provide them—are sure they are pure, reliable, safe.

Workers know Morton's Salt

Undoubtedly most of your employees use Morton's Table Salt in their homes. They know it is dependable and pure. So they accept Morton's Salt Tablets without hesitation. They know they are not some strange "medicine," but a wholesome health aid backed by a familiar name.

Cost less than 1¢ a man per week

Morton's Heat Relief Salt Tablets—the best that money can buy—cost so little! Can you afford to be without "heat fatigue" protection in your plant? Order Morton's Salt Tablets and Dispensers from your distributor, or directly from this advertisement. Write for free folder. MORTON SALT COMPANY, 120 So. La Salle St., Chicago 3, Ill.

Modern Plastic Dispenser. Practical, accurate, large capacity. 1000 tablet capacity..... $3.25

Heavy Duty Dispenser. Strong metal for rough treatment. Accurate. 500 tablet capacity.....$4.00

Morton's Salt Tablets Case of 6000, 10-grain, plain salt tablets....$2.10
Case of 6000 8-grain Salt Dextrose Tablets. $2.60

"Heat Fatigue" costs money!

Sweating robs the body of salt. This causes weariness—inability to work efficiently—and eventually, heat-cramps and prostration. "Heat fatigue" cuts down productivity, steps up absenteeism.

Morton's Salt Tablets act **fast** to replace lost body-salt—help keep production and efficiency at high levels. They're pleasant, easy to take, inexpensive.

FOR DEPENDABILITY IN FOUNDRY PRODUCTION . . .

The UNITED Steel JACKET

Reinforcement Gusset
EXTRA STRENGTH

Sturdy Channel Construction
BUILT TO LAST

Cooling Vent
ELIMINATES WARPING

United steel jackets are designed and manufactured exclusively for foundrymen who demand a superior product for high production work . . . Unique channel construction assures extra strength and durability . . . New self-cooling double reinforcement at the parting line eliminates warping on runouts . . . All parts are electrically spot welded with additional arc welds at strategic points.

United's engineering service is always available for your more difficult problems.

★ ***MANUFACTURERS OF CUSTOM SNAP AND SLIP FLASKS*** ★

United Pattern Works

12115 WOODBINE
DETROIT 28, MICHIGAN

1932

CONTACT CONOVER

1948

Among foundries that have given us contracts during the 16 years we have been in business a new slogan is in use: it is "CONTACT CONOVER". This confidence in the Conover Engineering Co. is based on customer satisfaction. More than 50% of our business comes from previously satisfied customers. 90% of the demands for our services comes from foundries of all sizes and types requiring a complete foundry engineering service. Many of the foundries we serve prefer a yearly development plan; some prefer a 5 year plan, and in some cases even a 15 year plan. Here is what one of Cleveland's modern foundries has to say about our service: "This is to inform you that we have employed this concern every year for the past 15 years, and find them very satisfactory. They have not only taken care of us to our satisfaction, but their suggestions have saved us many dollars. At the present time they have just completed a survey of our Cleaning Room, and we are in the process of changing in accordance with their suggestions. We have the highest respect for their integrity."

Conover Engineering Service has been used by foundries in 21 states. 12 firms, each operating several foundries, have given us repeat business; in some cases the work covered 3 years. More than half of the 35 firms we have served in Cleveland have offered us new contracts.

CONOVER ENGINEERING COMPANY

O. D. Conover, Consulting Engineer

6007 EUCLID AVE. PHONE: UTAH-1-0842

CLEVELAND 3, OHIO

INDISPENSABLE *to* FOUNDRYMEN

These units require one man operation only and are powered by electric motors. Dust proof bearing construction throughout. Specify the MOTO-HEAVER for speedy efficient material handling. For floor to floor or car to bin sand handling, specify the BIN-VEYOR.

SEND FOR LITERATURE NOW!

CLEVELAND FORMGRADER CO.

6723 DENISON AVENUE • CLEVELAND 2, OHIO

No other coating

LASTS

like

CO-LOIDAL-AC

Pattern Lacquer

Protect your patterns *permanently* against warping and swelling. CO-LOIDAL-AC insulates against moisture and heat. And it resists abrasion and mechanical damage. Because of complete dispersion of solids, this lacquer never settles—is ready for use after years of storage.

Available in gallons, five gallons and drums. Order direct from factory.

American Lacquer Solvents Co.

Perkiomen Junction, Phoenixville, Pa.

COLORS — Clear, Red, Black and Yellow — also Thinner.

Save AIR & TIME with Air-O-chek Air Guns

Patented ball and socket joint between the enclosed lever and the valve makes the difference.

Note powerful double grip afforded by long extra heavy ferrules, machine-formed over shoulder on shank.

Air and Time saved by Air-O-chek Air Guns are helping foundrymen maintain production beyond precedent.

Air-O-cheks are leakproof. They have no packing glands—no protruding levers or buttons. Flexing the hose controls air discharge — shut-off is instant and positive.

Precision machined from bar brass and stainless steel. Made in types and sizes for all requirements.

Install Air-O-cheks and compare results with the best you have ever had. Catalog on request.

AIR-WAY PUMP & EQUIPMENT COMPANY, 1058 N. Kilbourn Ave., Chicago 51, Ill.

DOUBLE YOUR PRODUCTION—with the fastest and most powerful Rammer made—

NO. 4 DAYTON RING VALVE BENCH RAMMER

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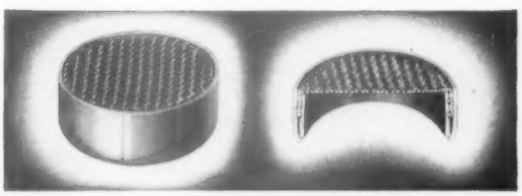
Aside from its efficiency, the chief advantage of this Rammer lies in its long life. The Valve Unit will last for years without repair or replacement. The Cylinder Bore and Piston Rod are HARD CHROME PLATED, features which double the life of the Rammer and reduce maintenance costs at least one-half.

Have been adopted as standard by some of the largest users of Rammers throughout the Country. MADE IN FIVE SIZES. Send for Bulletin No. 300.

DAYTON PNEUMATIC TOOL CO., DAYTON, O.

CORE BLOWERS!

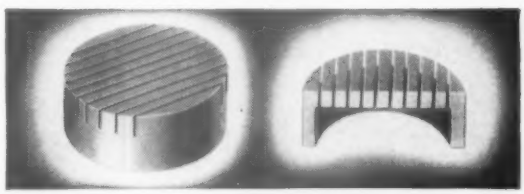
NO BLOWOUTS with RIENACKER CORE BOX VENTS



SCREEN TYPE—Patent No. 2,263,974

For HIGH-SPEED production. Made from 30 mesh monel screen lapped 3/16" over brass innertube and firmly secured with brass outertube, making a strong, fool-proof unit. Each vent is sized through a die assuring accurate fit. The compression between outer and inner tubes holds screen securely in place without slightest danger of blow-out. Costly work stoppages to repair or replace vents are eliminated.

Use Rienacker core vents (screen type) whenever possible—on all flat surfaces, and on curved surfaces wherever core marks are unimportant. You get faster air escape with minimum liability of clogging.



SLOTTED TYPE—Patent No. 2,238,506

For CONCAVE and CONVEX RADII. Made of brass, precision slotted for greatest air escape possible with this type of vent. Standard slot width for cast iron .014; for brass .010. Core vent hole should be made with a step-drill so that bottom of vent rests on shoulder thus provided. This slotted vent is easily shaped to any curved surface; leaves no core marks on casting.

• • •

ORDER THROUGH YOUR JOBBER

DEALERS IN ALL PRINCIPAL CITIES

LANDIS MFG. CO.

2035 HILTON ROAD • FERNDALE 20, MICH.

Manufacturers of Rienacker Core Vents

Announcing the New-

Morrison CORE OVEN

MORE PRODUCTION—with Uniformity . . . Speed
LESS COSTS—mean Fuel Savings . . . Space Savings

The new MORRISON standard Oven is designed for core-baking, mold-drying, and similar applications requiring maximum uniformity obtained by forced convection of heated air.

The MORRISON method of uniform heating by forced convection is also ideal for curing plastics, baking paint and enamel finishes, and other processing of materials up to 750° F.

Morrison ENGINEERING CORP.

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PLEASE SEND A MORRISON SPECIALIST TO SEE ME IMMEDIATELY.

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ADDRESS .....

CITY ..... STATE .....

FOX HIGH SPEED STAND GRINDERS

- SIMPLICITY OF DESIGN
- RUGGED CONSTRUCTION

Featuring double ball-bearing construction and efficient single-wheel mounting.

Grinding wheel rotates on double bearings around a dead shaft anchored at both ends—completely eliminating all vibration and shaft whip . . . and the entire unit guaranteed for two years!

Have you the new Fox Catalog?

FOX GRINDERS, INC.

OLIVER BUILDING PITTSBURGH 22, PA.

CORE SAND COLORS FOR IDENTIFICATION

Some of the larger foundries have found it practical to color their various grades of core sands. This eliminates guesswork and assures the proper use of the required type of core sand for the particular job at hand.

Our laboratories have developed a line of special dyes in a range of colors that have been carefully tested and found suitable as well as economical. Write us for details and samples.

EATON CHEMICAL AND DYESTUFF COMPANY

1490 Franklin Street Detroit 7, Michigan

Canadian Plants: Windsor and Toronto

Want Perfect Pattern Contour for Your Castings?

BUCKEYE "3-IN-1" FLASK GUIDES

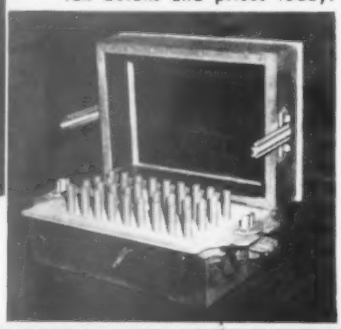
(Patented)

MAKE EVERY LIFT A PERFECT LIFT!

You get a true perpendicular lift every time — when you use Buckeye "Three-In-One" Flask Guides — no rocking or shifting of the cope is possible. No ruined molds.

For precision lifts, perfect pattern contour, lowered costs and stepped-up production, specify Buckeye "Three-In-One" Patented Flask Guides for all straight or tapered flasks. Furnished in 3, 4, 5, 6, 7 and 8" lengths. Write for full details and prices today!

Patented "3-in-1" Flask Guides prevent cope from shifting while being lifted from drag!



THE BUCKEYE PRODUCTS COMPANY

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Manufacturers of Core Oil • Parting • Core Compounds • Refractory Cements • Flask Fittings

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For

CORE WORK, SAND FACINGS, SPRAYS

Write for pamphlets giving detailed information. Both materials carried in stock by America's foremost foundry jobbers

Robeson Process Company
(Established 1905)

American Gum Products Co.
(Established 1915)

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WHAT'S NEW WITH TAMASTONE

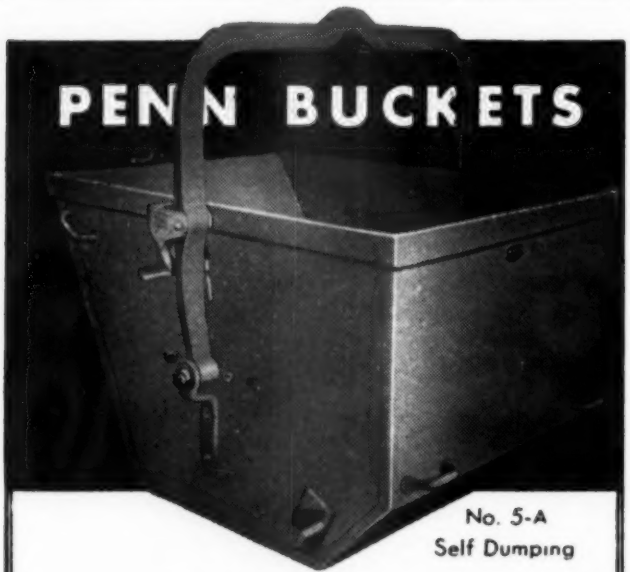
Follow the Crowd to Booth 409-411

Every year, new applications, new labor saving methods are discovered with TAMASTONE, the perfect pattern compound. Every year we bring these new foundry practices to the convention and show you how others are solving their problems. Show you how foundries everywhere are increasing production . . . Some as much as 600%.

Year after year crowds like this jam the Tamms convention booth to see actual TAMASTONE demonstrations . . . See results obtained with No. 90 Iron Oxide . . . and learn all about TAMMS Foundry Specialties. Just look for the booth with a crowd . . . that's Tamms!

TAMMS SILICA CO., 228 N. La Salle St., Chicago 1, Illinois

PENN BUCKETS



No. 5-A
Self Dumping

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Welded construction prevents "clinging" makes them empty easily and completely.

MEMBER

WRITE TODAY FOR NEW BULLETIN DIMENSION SHEET AND PRICE LIST

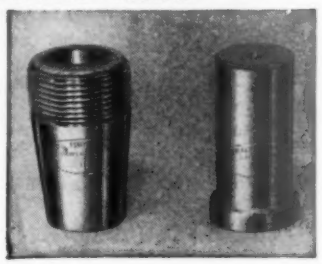
PENN IRON WORKS

READING, PENNA.

BLAST CLEANING NOZZLES

Saves AIR

Saves SHOT, GRIT SAND



FEDERAL BLAST NOZZLES ARE MADE OF

TUNGSTEN-CARBIDE

"The hardest material known to man." For this reason they outwear ordinary nozzles in use for sand blasting and metal cleaning by the blast method. Air consumption is reduced and the blast is *concentrated* because the hole in the nozzle wears very slowly. This means low cost operation.

TRY ONE AND SEE FOR YOURSELF—Made in all sizes and types: adapters furnished for all types of blast cleaning equipment.

The Federal Foundry Supply Company

4600 E 71ST ST CLEVELAND 5, OHIO

QUALITY • DEPENDABILITY • SERVICE

Producers of

PressureProof

ANGELL

ANGELL

CHAPLETS

and all types of nails

The Angell Nail

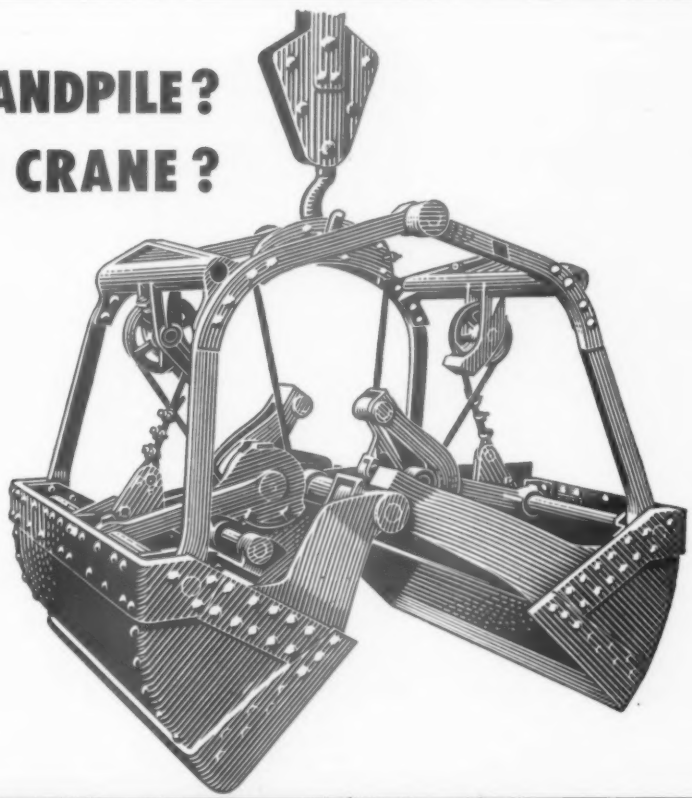
& CHAPLET COMPANY

4580 East 71st Street Cleveland 5, Ohio

HOW HIGH IS YOUR SANDPILE?

HOW LOW IS YOUR CRANE?

Here's a Blaw-Knox Single Line, Hook-On Type Bucket that needs only 6' 7" operating headroom! Perhaps one of the 4 sizes of this design will prove exactly what you need for efficient handling of moulders' sand, coke, slack coal or other loose bulk materials. You'll find it fully described in Catalog 2002, which will be forwarded immediately on request.



BLAW-KNOX DIVISION

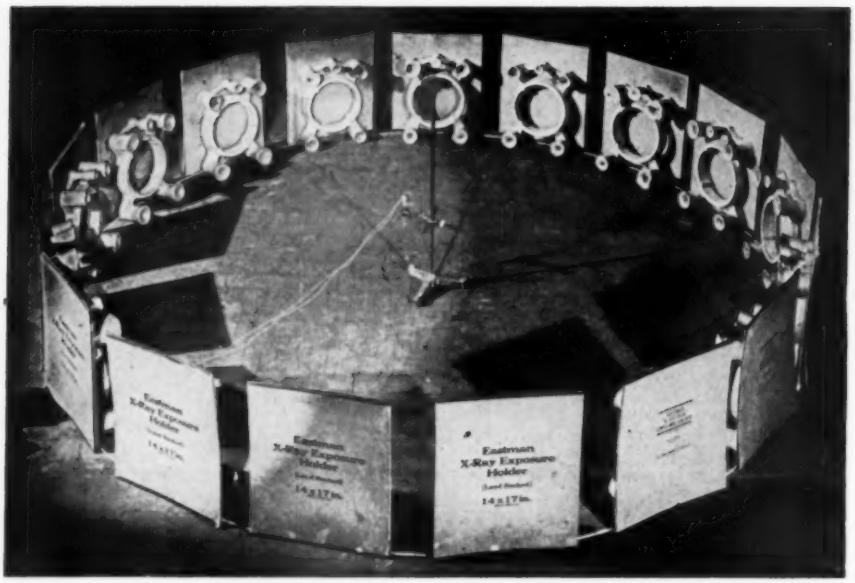
OF BLAW-KNOX COMPANY

2097 FARMERS BANK BUILDING

PITTSBURGH 22, PA.

BLAW-KNOX FOUNDRY BUCKETS

RADIUM RADIOGRAPHY *Performs a* NEW FUNCTION



PHOTOGRAPH COURTESY OF CRANE CO.

Visit us at Booth No. 236—
American Foundrymen's Association Exhibition
May 3rd-7th—Philadelphia, Pa.

"Directional solidification" can easily be studied by the set-up illustrated in the photoaraph—to indicate the best method of casting with a minimum of defects in the casting itself.

Radium has become a new foundry tool which directly effects an increase in yield. It permits accurate determination of the proper procedure in gating and risering "tough" castings. Seventeen cylindrical castings were radiographed simultaneously by Crane Co. to ascertain the most productive and economical foundry practice.

Radium thus performs a valuable additional function.

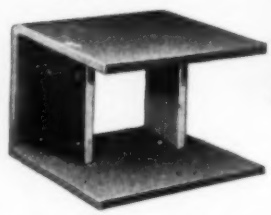
For inspection, for determination of directional solidification, Radium is available in capsules of various unit strength in duralumin holders which may be leased or purchased at low rates.

The rental includes full coverage insurance; heavy load storage containers and slide rule exposure calculators.

RADIUM CHEMICAL COMPANY, INC. • 570 Lexington Ave., New York (22), N. Y. • Chicago: Marshall Field Annex Bldg.

BUFFALO *"Double Angle"* CHAPLETS

★ Greater Strength
★ Burn in more easily
★ Less Chilling



The extra strength of this exclusive *Angle Design* (originated and patented by Combined Supply and Equipment Co.) permits the use of these Buffalo Chaplets in thinner gauges.

Direct advantages are the ability to burn in more easily and a greater resistance to chilling.

Thorough coating promotes immediate fusion with the molten metal.

Your requirements may be met with Buffalo "Angle Stem" (Single) or "Double Angle" Chaplets, in a range of four metal gauges. Complete information, samples and prices promptly furnished.

CATALOG NO. 14 MAILED ON REQUEST
Contains useful data on complete line of chaplets

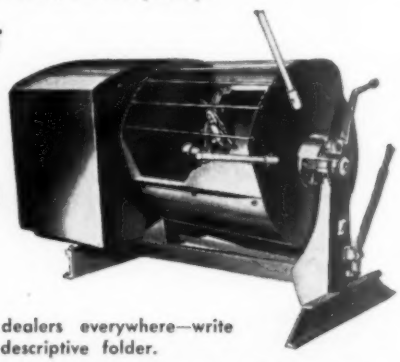
Combined SUPPLY & EQUIPMENT CO., INC.
211 CHANDLER ST., BUFFALO 7, N. Y.

MC MIXERS FOR THE FOUNDRY

Triple mixing hoes for thorough mixing—flared drum for quick, easy discharge. Available with gasoline engine, electric motor, or belt pulley.

THE LOW-COST METHOD FOR HANDLING

- FACING
- CORE SAND
- CUPOLA "MUD"



Sold by leading dealers everywhere—write for full facts and descriptive folder.

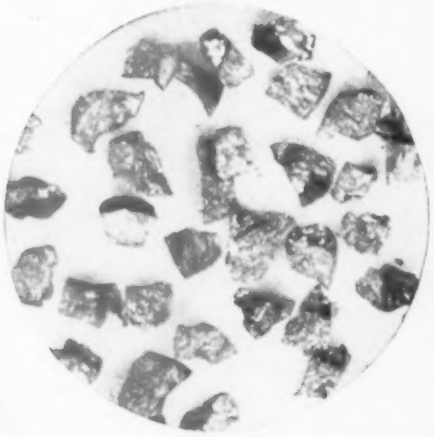
CONSTRUCTION MACHINERY COMPANY
Waterloo, Iowa, U.S.A.

NATIONAL

Controlled

SHOT and GRIT IMPROVE FINISHES . . . SAVE TIME . . . CUT COSTS *BECAUSE THEY HIT HARDER . . . CLEAN FASTER*

With National Metal Abrasives the surface is properly cleaned and is free of all objectionable scale and sand. "Controlled" Metal Abrasives save time and cut costs because they stand up better and wear longer than ordinary abrasives. Send for complete information.



Shown here is a very clear idea of the reasons "Controlled Grit" does a better, faster job of cleaning. Chunky bodies like these back up the sharp edges with solid weight, and solid weight hits harder, cleans faster.

Now Being Manufactured By

National Metal Abrasive Co.
Cleveland, Ohio

Western Metal Abrasives Co.
Chicago Heights, Ill.

SOLD EXCLUSIVELY BY

Hickman-Williams & Co. Inc.

CLEVELAND NEW YORK INDIANAPOLIS CHICAGO
PITTSBURGH CINCINNATI ST. LOUIS PHILADELPHIA DETROIT

New Redford
CUTTING & BENDING TOOL

PATENTS PENDING

WILL SOLVE MANY OF YOUR CORE WIRE PROBLEMS. INDISPENSABLE TO THE FOUNDRY. CUTS, BENDS AND DUPLICATES CORE WIRES UP TO 5/16". BAND IRON UP TO 1/8" x 1".

SEE YOUR FOUNDRY SUPPLY DEALER OR WRITE FOR FOLDER AND PRICE.

REDFORD IRON & EQUIPMENT CO.
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6 SETS OF BEARINGS

6 TIMES THE SERVICE

DESMOND HEX DRESSERS, with six- ole bearing blocks, are the most durable mechanical dressers made. As one set of bearing holes becomes worn, turn blocks to new set. Made in five sizes using corresponding Huntington cutters. Desmond —the only complete line—assures you of better grinding wheel performance. Write for catalog and name of your Desmond Distributor. **The Desmond-Stephan Mfg. Co.—Urbana, Ohio**

Desmond

the only complete line of grinding wheel

DRESSERS & CUTTERS

BALL BEARING DRESSERS | REVOLVING CUTTER TYPE DRESSERS | DIAMOND HAND TOOLS AND NIBS | WHEEL TYPE DRESSERS | SIMPLEX STEEL-SLIDE VISES

Heroult

GANTRY-TYPE

ELECTRIC MELTING FURNACE

Removable roof has 4-point support for lifting, to reduce the refractory-damage due to warping.

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Write for your free copy of the new Heroult Catalog.

AMERICAN BRIDGE COMPANY · USS Heroult FURNACES · UNITED STATES STEEL

UNITED STATES STEEL

Always Available!

AN IDEAL FUEL FOR DRYING MOLDS

● Leading foundries everywhere can depend on Ford Charcoal Briquets for drying molds because of their year 'round availability. Ford Charcoal Briquets give you all these important advantages, too—portable, dry, penetrating heat . . . minimum fines or breakage . . . burn uniformly for a longer time.

Get the favorite foundry fuel for drying molds . . . pre-heating castings . . . as a cover on molten metal.

Order now from your distributor, or write the Ford Motor Company, Sales Department, Iron Mountain, Michigan.

Ford

Charcoal Briquets

The *heat-packed* charcoal

CLASSIFIED ADS IN

THE FOUNDRY

BRING RESULTS!

● Do you need a superintendent, foreman, metallurgist, electric furnace man, core room foreman, pattern maker, cupola expert?

● Have you some used equipment which should be turned into cash?

● Are you seeking a job?

Address:

CLASSIFIED ADVERTISING SERVICE

THE FOUNDRY

PENTON BUILDING, CLEVELAND, O.

Put the "RAP" where it belongs

Why 'take the rap' for high shakeout costs when the **"BRANFORD" FLASK RAPPER** will cut them to a minimum . . . Made in seven sizes, capable of handling any size flask.

Write for Catalog "G" describing the complete line of "Branford" pneumatic vibrators, shakeout equipment and accessories.

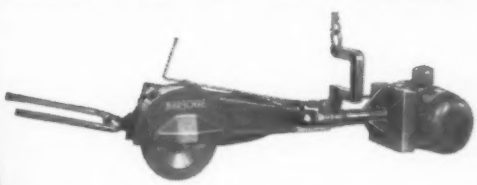
"BRANFORD" THE VIBRATOR WITH THE KICK

1915 BRANFORD VIBRATORS U.S.A.

New Haven Vibrator Company

130 CHESTNUT ST. NEW HAVEN 7, CONN.

IT'S EASY TO TAKE THE GRINDER TO THE WORK



The Marschke Heavy Duty Swing Frame Grinder is easy to maneuver and gives maximum metal removal. Massively constructed for long, dependable service, this Marschke Grinder provides smooth, true wheel rotation for steady contact between the wheel and the work . . . gives minimum wheel wear. Provision is also made for adjustment of wheel surface speed to compensate for wheel wear.

Simplicity of construction, plus balance and maneuverability, contribute to efficient operation. These Marschke Grinders quickly pay for themselves and give many years of trouble-free service.

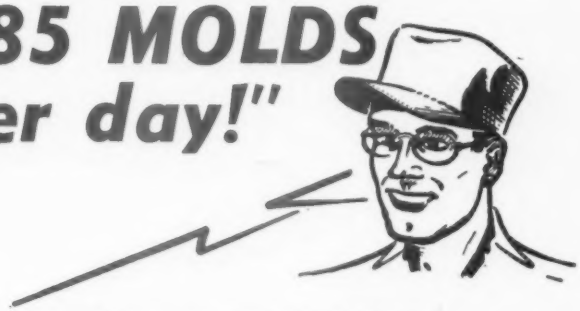
Other Marschke Grinders available include the "In-Between" Grinder, pedestal and floor stand grinders and buffers.

Write today for complete details

VONNEGUT MOULDER CORPORATION

1839 MADISON AVENUE • INDIANAPOLIS, INDIANA

"PRODUCES 285 MOLDS per day!"



NO. 44 HEAVY DUTY PORTABLE

THIS MOLINE SQUEEZER DOES THE JOB DAY AFTER DAY . . .

It's a fact—you get increased production and reduced foundry costs with Moline Molding Machines. Day in and day out the No. 44 Squeezer, shown here, is consistently producing 285 molds with 12" x 16" flasks! That's real production in any foundry, and is one of the many reasons why more and more foundries from coast to coast are becoming alert to the merits of Moline Squeezers. They are replacing their high priced, high maintenance cost machines with the Moline type best suited for their work. For further information write to us today.

WE SHIP QUICK

Seventy Years of Service

MIW

Send for our NEW descriptive folder

MOLINE IRON WORKS

MOLINE, ILLINOIS, U. S. A.

ACCEPTED

BY AMERICA'S LARGEST INDUSTRIAL PLANTS TO DO THE TOUGHEST BLASTING AND PEENING OPERATIONS

HI-GRADE METALLIC

FAMOUS

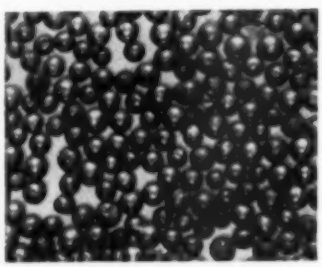
FOR ITS ABILITY TO STAND UP UNDER REPEATED HARD USE

SHOT

- ROUND
- UNIFORM IN SIZE
- UNIFORM IN HARDNESS
- LACKS IRREGULAR SHAPES

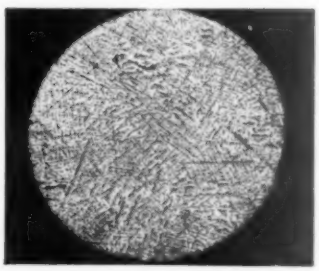
GRIT

- RECTANGULAR
- SHARP
- TOUGH
- DURABLE



UNRETOUCHED PHOTO OF HI-GRADE SHOT

CLAYTON-SHERMAN ABRASIVES COMPANY
3896 LONYO ROAD
DETROIT 10, MICHIGAN
CEdar 7200



MICROSCOPIC STRUCTURE OF METAL

"Best Available Plant Engineers Consulted"

When the Foster-Forbes Glass Company contemplated the construction of a new batch-mixing plant, the best available plant engineers were consulted, including those of The Neff & Fry Company.

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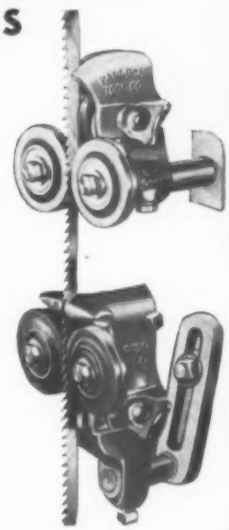

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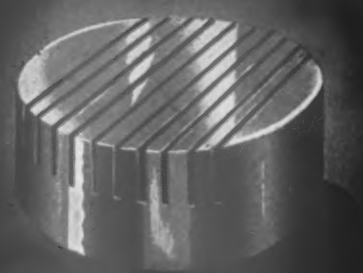

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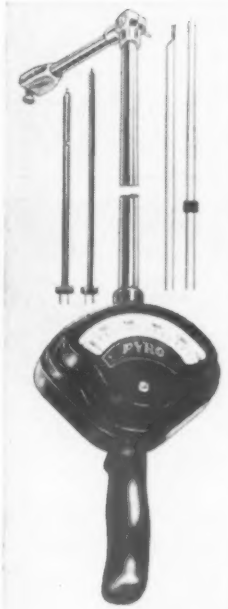

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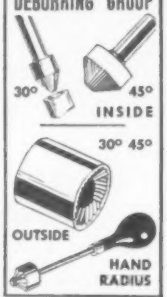

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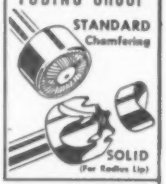

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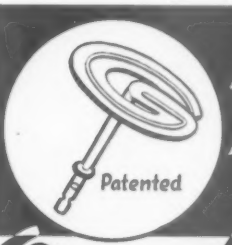

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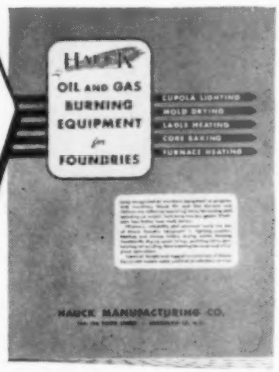

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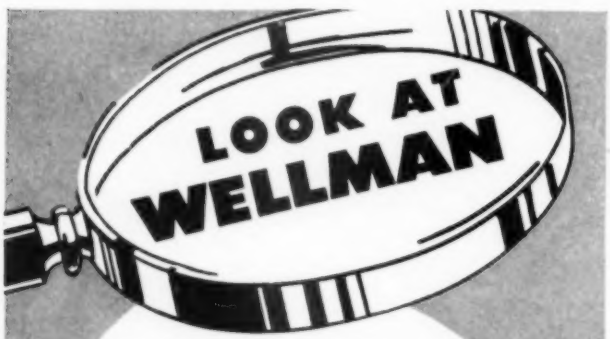

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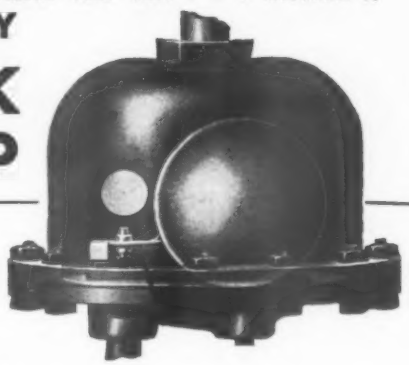

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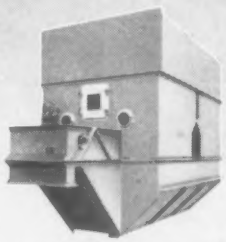

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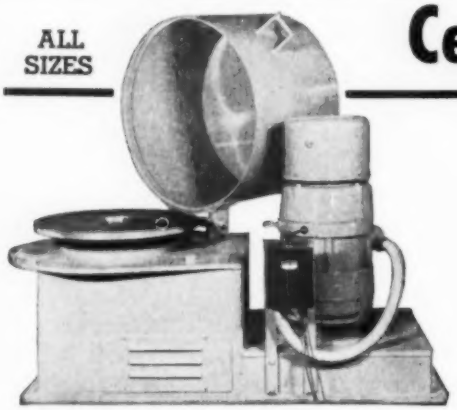

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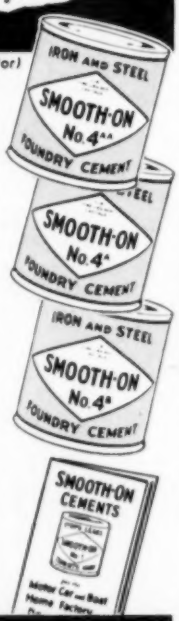

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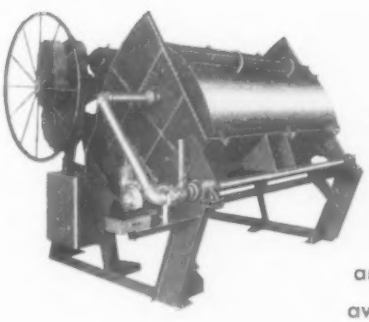

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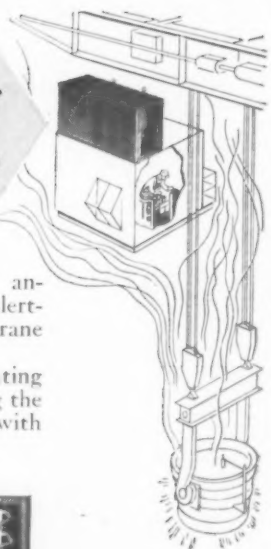

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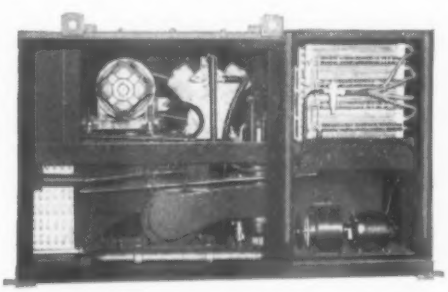

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Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.
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Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WELDING GAS

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING APPARATUS (Electric Arc)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.
Westinghouse Electric Corp., Pittsburgh 30, Pa.

WELDING and CUTTING APPARATUS and SUPPLIES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING ELECTRODES (Carbon)

National Carbon Co., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

WELDING RODS & ELECTRODES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WHEELBARROWS

Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS, ABRASIVE (Cut-off)

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Raybestos Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Norton Company, Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, Ohio.

WHEELS (Wire)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE BENDERS

Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

WIRE BRUSHES

Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE CUTTERS

Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

WOODWORKING MACHINERY

Do All Company, Des Plaines, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Oliver Machinery Co., Grand Rapids 2, Mich.
Parks Woodworking Machine Co., 1546 Knowlton St., Cincinnati 23, Ohio.

X-RAY EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric X-Ray Corp., 4855 West McGeogh Ave., Milwaukee 14, Wis.
Westinghouse Electric Corp., Pittsburgh 30, Pa.

X-RAY FILMS

Eastman Kodak Co., Rochester, N. Y.
General Electric X-Ray Corp., 4855 West McGeogh Ave., Milwaukee 14, Wis.

ZINC

American Smelting & Refining Co., 120 Broadway, New York 5, N.Y.
George Sall Metals Co., Philadelphia, Pa.

—When writing advertisers, please mention THE FOUNDRY—

Classified Advertising

Help Wanted

FOUNDRY SUPERINTENDENT

Grey iron and semi-steel—25 tons per day medium to heavy work. Chicago location.

Man we seek must be thoroughly competent in all phases of casting production. He will have responsibility and authority and will be required to properly handle both. Acceptable reference essential. This position open now. Salary open. Replies confidential.

Box 944

The FOUNDRY Cleveland 13, Ohio

ALUMINUM FOUNDRY FOREMAN

For modern foundry in Central Connecticut on aluminum castings—sandcast experience. Knowledge of pattern shop work. Able to train molders and coremakers. Sound background of modern foundry practices. Sandslinger in operation. Will pay the right man substantial salary.

BOX 930

The FOUNDRY CLEVELAND 13, OHIO

SALESMAN

To sell top quality line of women's uniforms to industrial plants. Our uniforms, sold through catalog, can be carried in conjunction with your present line. 7% commission plus substantial monthly bonus on quota. Reply by letter giving complete details of background. Exclusive territories. ADDRESS: Claire Frocks, 424 East Fourth St., Cincinnati 2, Ohio.

FOUNDRY SUPERINTENDENT

Medium size gray iron foundry. Must be capable of handling all phases of foundry operation doing diversified work. Address: Box 932, The FOUNDRY, Cleveland 13, Ohio.

SALES REPRESENTATIVE

One handling non-competitive line in Chicago territory for old established nonferrous foundry making magnesium, aluminum and bronze castings and also operating a large pattern shop. Liberal commission. Address: Box 941, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY METHODS MAN

Between 25-40 years of age. Must be familiar with all phases of foundry work. Address: Box 934, The FOUNDRY, Cleveland 13, Ohio.

OFFICE MANAGER

Assistant treasurer capable of developing into assistant to general manager of moderate size alloy steel foundry. Want competent hard nosed, experienced operator who can "ride herd" on foundry costs and rigidly control supplies, inventories and accounts. We are doing development work and going places. Send details of experience, education and home study and starting salary expected. Address: Box 935, The FOUNDRY, Cleveland 13, Ohio.

COMPETENT CUPOLA OPERATOR

Exceptional opportunity for one capable of making shot. Submit experience, references and salary desired. Permanent situation. Advise phone number. Address: Box 886, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Capable of heading and gating steel castings up to 35 tons. Excellent opportunity for the right man. State age and experience. Replies treated in confidence. Address: Box 948, The FOUNDRY, Cleveland 13, Ohio.

ASSISTANT METALLURGIST

Excellent opportunity with long established, successful Company in New York State, for young man with gray iron foundry experience. This is a permanent position at a salary commensurate with training and experience and with opportunity for advancement. Address Box 933, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

INDUSTRIAL ENGINEER

Must be a competent, well qualified executive, capable of directing and training all personnel of Standards Department. Must be experienced in incentives, job evaluation, cost control, methods, plant layout, routing, labor relations pertaining to standards. Foundry experience required. Large Michigan production foundry.

BOX 931

The FOUNDRY CLEVELAND 13, OHIO

BRASS FOUNDRY FOREMAN

For modern production shop. Must be thoroughly acquainted with the mixing of metals and with squeezer match plate work. State experience and references in first letter. Address: Box 896, The FOUNDRY, Cleveland 13, Ohio.

CLEANING ROOM FOREMAN

With side frame and bolster experience. Excellent opportunity with large foundry in Western Pennsylvania. Address: Box 921, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT OR ASSISTANT

For a large bronze foundry handling a wide range of alloys. Must be experienced in heavy dry sand molding. Apply giving history and references. Address: Box 922, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

TECHNICAL EXECUTIVE

Administration of research and technical control in foundry and general manufacturing. Broad experience in casting and manufacturing of nonferrous, cast iron and steel pressure containing parts. Established reputation in foundry and welding technology, technical control and new materials development. Fully familiar with code requirements. Age 41. Ph.D. degree in metallurgy from leading university. Address: Box 929, The FOUNDRY, Cleveland 13, Ohio.

DESIGN—DRAFTSMAN

Four years iron foundry experience; general maintenance, special production equipment, core and pattern equipment, flasks and plates for jolt and slinger. Twenty years on drawing board, mainly mechanical and some light structural. Age 41, married. Desires connection in South or Southwest United States. Address: Box 940, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

A-1 foundryman, practical with many years' experience in grey iron, semi-steel, brass, bronze and aluminum castings. Preferred southern or west coast states. Employed as foundry superintendent with good knowledge of ferrous and nonferrous practices, also centrifugal and precision castings. Address: Box 887, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER

With long, valuable experience in managing, building up and maintaining foundry and machinery business on profitable basis, invites correspondence preliminary to interview. Ability to direct all office, sales, financial and production activities efficiently and economically unquestionably established by previous record. Address: Box 946, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Thirty-two years' foundry experience, Twenty-five years as foundry superintendent. Capable of taking complete charge of all foundry operations, both ferrous and nonferrous. Technical and practical training. Good connection more important than a large salary. Address: Box 919, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

PATTERNSHOP FOREMAN

Thorough experience from small to large patterns—wood, metal or plaster. Capable of soliciting and making layout and performing work myself in small shop. Can supervise men and teach apprentice in larger shop. Apprentice can be taught in two years to do most of work. Make matchplates, core blowing boxes and driers also rig work for foundry including blowing of medium size cores in present wood core boxes. Address: Box 913, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

High type with practical and technical background wishes to make change. Twenty-five years as operating manager of light and medium gray iron foundries. Three years as free lance consultant. Can handle all phases of operations including design, equipment layout, production, costs, sales with special emphasis on cupola operations. Address: Box 917, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Capable, progressive grey iron foundryman now employed desires to make a change. Have 23 years of experience covering all phases of the business. Understand foundry costs thoroughly and can apply this knowledge to very good advantage. Desires to make a contact with an organization who wishes to secure ambitious, capable and honest man. Age 44 years. Address: Box 876, The FOUNDRY, Cleveland 13, Ohio.

REGISTERED PATENT AGENT

Chemist, two scientific degrees, extensive patent experience in chemical, metallurgical and mechanical arts, available for part-time work. Address: Box 856, The FOUNDRY, Cleveland 13, Ohio.

MASTER MECHANIC

Master mechanic and maintenance head of foundry and machine shop. 14 years' experience. Reliable references gladly furnished. Address: Box 899, The FOUNDRY, Cleveland 13, Ohio.

SALESMAN

Foundry executive now employed and having 26 year's experience in all phases of the grey iron foundry business. Will consider a sales position with a successful foundry supply company. Prefer Central New York state territory. Address: Box 877, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERVISOR

Desires connection with jobbing and production foundry. 30 years as molder and foreman. Now superintendent in foundry pouring 35 to 40 ton per day. Will make change about May 1st. Address: Box 912, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY MANAGER OR SUPERINTENDENT

Thoroughly versed in all departments, technical and practical. Maximum results guaranteed. Middle age, married and good health. Address: Box 924, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Twenty-five years' experience as foundry superintendent, practical molder and core maker. Can read blueprints, mix by analysis and understand cupola thoroughly. At present employed. Address: Box 731, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM PERMANENT MOLD FOUNDRY ENGINEER

TWENTY-FIVE YEARS' EXPERIENCE. COOKING UTENSIL SPECIALIST OR ANYTHING YOU WANT MADE. FULL OR PART TIME. ADDRESS: BOX 667, THE FOUNDRY, CLEVELAND 13, OHIO.

CORE ROOM FOREMAN

20 years' experience as core room foreman in steel on all classes of work, both large and small. Employed at present but desire change. Address: Box 901, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Positions Wanted

FOUNDRY SUPERINTENDENT OR GENERAL FOREMAN

Practical man, 25 years' executive experience in grey iron jobbing shops making light, medium and heavy work. Now employed. Address: Box 950, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN

With 15 years' sales experience to foundry trade would like one or two lines on commission in Chicago area where well acquainted. Address: Box 870, The FOUNDRY, Cleveland 13, Ohio.

PRODUCTION PLANNING

Young foundryman, married, desires position in the production planning department of progressive firm. Nine years' experience in the foundry, last five years in charge of planning for large valve concern in brass, iron and steel. Address: Box 951, The FOUNDRY, Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS
$3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (38 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
101 DUN BLDG. BUFFALO 2, N. Y.

SALARIED PERSONNEL

$3,000—$25,000. This reliable service, established 1927, conducts confidential negotiations for high-grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.

Opportunities

90 PER CENT OF THE CUPOLAS MELT UP TO ONLY 50 TO 60 PER CENT

capacity per hour—although the best and hottest iron is produced only when cupola is operated to its capacity. Report on your cupola may prove an eye-opener—usually the savings are surprising. Every pound of steel used in cupola mixtures reduces cost and increases strength 20 to 60%, because steel is purer than the most expensive pig iron. Watch the scrap pile—statistics prove casting losses can be held between 1 to 5% depending on the line of work. Our system is not an expense—but a valuable investment. Synopsis free.

McLAIN'S SYSTEM INC.
236 E. NORTH AVE.
MILWAUKEE, 12, WIS.

COPPER FERRITE CASTINGS

Sales representatives for copper ferrite castings wanted in New York, Pennsylvania, New Jersey, Illinois and Indiana. Other territories also open for consideration. For further information write:

OLD COLONY FOUNDRY COMPANY
EAST BRIDGEWATER, MASS.

IRON FOUNDRY OPERATOR

Mechanical engineer, successful operator and former owner offers his services to put your foundry in more profitable operating condition. Past connections include nationally known foundries in East, South and Middle West. No job too big or small. Address: Box 947, The FOUNDRY, Cleveland 13, Ohio.

Opportunities

MANUFACTURERS

Foundry cast-alloy products, novelty one to three-way swivels. Will sell well to industrial and consumer fields. Royalty license basis. Address: FRED ANDERSON, BOX 567, SHERIDAN, OREGON.

OPPORTUNITY

We can furnish empty tight and slack wooden barrels also steel drums for your products. ADDRESS: BUCKEYE COOPERAGE STATION, C.P.O. BOX 1501, CLEVELAND, OHIO.

Open Capacity

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample. Address: OREGON CASTINGS CO., RD 3, Lititz, Pa.

OPEN CAPACITY

Open capacity in grey iron foundry. Waterfronts—burners—bench, pumper and floor work Address: P.O. Box 321, Belleville, Illinois.

OPEN CAPACITY

Light production work on squeezer and cope and drag machine. Southwest territory. Address: Box 939, The FOUNDRY, Cleveland 13, Ohio.

Foundry Consultant

ATTENTION: GRAY IRON FOUNDRIES

Are you having cupola trouble such as cold iron, slow melting, a low melting ratio, extreme lining burning? Write for circular. Address: MR. HENRY MESSER, 1117 WILLOW AVE., SOUTH SAN FRANCISCO, CALIFORNIA.

Wanted-To-Buy

WANTED
TUMBLING BARRELS

For removing cores, separating castings from gates and preliminary cleaning of castings in foundry. Give complete information in reply.

BOX 936
THE FOUNDRY CLEVELAND 13, OHIO

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

WANTED
PATTERNSHOP

Patternmaker wants to buy part interest or complete wood metal patternshop. Experienced and capable of managing shop and showing profit on work. Address: Box 945, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Sand cutter—American—45" to 60" blade. Type "AA" or "AM". Address: RICHARD MACHINE WORKS, INC., 307 S. MAIN ST., NORFOLK 6, VA.

Foundries For Sale

FOR SALE
LARGE GREY IRON FOUNDRY

Modern plant located in a community unusually favorable for this type of operation. Highly mechanized. Unlimited supply of low phosphorus Pig iron and coke assured. Available at 25% less than sound value of approx. $1,000,000. Complete details including recent appraisals upon request from exclusive representatives.

BUSINESS BROKERS CO.
100 W. MONROE ST., CHICAGO, ILL.
RANDOLPH 2555

FOR SALE

All or part interest or lease—small 8 jolt squeezer floor foundry fully equipped with core room, sand blaster, etc. Address: GENERAL LAMP MFG. CORP., ELWOOD, INDIANA.

GRAY IRON FOUNDRY FOR SALE

Located in the Piedmont section of North Carolina. 10,000 sq. ft. of floor space. Concrete block and steel building, completely equipped with squeezers, sand blasting and shot cleaning equipment. $50,000 will finance. Address: Box 942, Cleveland 13, Ohio.

FOUNDRY FOR SALE

New building, concrete and steel. 12,000 sq. feet, new equipment, 42" cupola, 15 tons per day capacity. Offer controlling interest. Sell out-right or will lease. Address: Ipava Foundry Corp., Ipava, Fulton County, Ill.

MODERN ALUMINUM FOUNDRY

For sale or lease. New building and mechanized equipment. Located in middle of tractor manufacturing area. Reason—death of owner. Address: Box 892, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Grey iron foundry. Equipped for production and jobbing work. Capacity 40 tons. Thirty years in business. Ideal location in Midwest industrial area. Now melting ten tons per day for eight large industrial plants. Good labor conditions. Excellent scrap supply locally. Owner in poor health. Address: Box 903, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRIES FOR SALE

Gray Iron Foundry—Well equipped for light castings. Profitable operation. Priced reasonable.

Gray Iron Foundry—Equipped to produce castings up to 5 tons. Price $125,000.

EDWARD H. ZOLL
790 BROAD ST. NEWARK 2, N. J.

GREY IRON FOUNDRY FOR SALE

Complete with pattern and machine shop. Going business with 27 years' successful operation. Ideal location in growing industrial section of Texas. Well established demand for product. Price $125,000. Terms. Address: Box 612, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Foundries For Sale

GREY IRON FOUNDRY

Located in fast growing Rock Mountain Area, capacity 125 tons per month. Well established clientele, making profitable year around business. Six months' supply of coke and pig iron on hand and contracts for future supplies. Present owners have other interests. Purchaser must be qualified to continue producing good castings. Address: Box 938, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Small foundry, Northeastern Pennsylvania. Now operating, priced for quick sale. Address: Box 893, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Gray iron foundry, Northeastern Oklahoma. Operated continuously since 1910. Fully equipped, leased rail siding, pattern coke and sand storage. Doing good business. Address: Box 840, The FOUNDRY, Cleveland 13, Ohio.

For Sale

SAND BLAST MACHINES

We have in stock three brand new complete portable sand blasting machines 100 pound, 350 pound and 650 pound capacity in sand. Can be used with steel grit also. New "Sanstorm" type, non-clogging design. Ideal for auto body shops, foundries, heat treaters, painters and forge shops. We also have in stock for immediate shipment a #22 Moline portable molding machine (brand new) also a used belt drive tilting tumbling barrel.

FEDERAL FOUNDRY SUPPLY COMPANY
4600 EAST 71st ST. CLEVELAND 5, OHIO

FOR SALE

1—18" x 25" Roots-Connersville positive pressure blower with 125 H.P. motor.
1—Motor operated Butterfly valve.
4—3 Ton Whiting steel converter shells with 2 tilting assemblies.
2—Champion 48" x 48" x 8" draw power flask push-off machines.
1—Osborn Jolt, rollover, draw molding machine.
3—Osborn Jolt strip molding machines.
2—Nichols Jolt, squeeze molding machine.
1—Nichols Jolt table.
2—Osborn Jolt, rollover squeeze molding machine.
1—3' x 5' Simplicity shakeout machine.

GUNITE FOUNDRIES CORP.
ROCKFORD, ILL.

FOR SALE

Rebuilt Hough model HS 1/3 cubic yard payloader. Excellent for unloading sand from box car or for general foundry work.

TYLER EQUIPMENT CORPORATION
TELEPHONE 375
251 SHAKER ROAD
EAST LONGMEADOW, MASS.

FOR SALE

1—Trent Electric Furnace with Brown Instruments, 3½ KW, 175 volts, 1 phase, 60 cycle, size MLR 4A, #60861.
1—Fisher 22" Tilting Furnace, take #275 crucible, equipped for gas firing.
1—Tilting Furnace, take #400 crucible, equipped for gas firing.
1—Eclipse Crucible Type Brass Melting Furnace, gas fired, catalog #200S.
1—Centrifugal Casting Machine and Motor, Centri-meco made, model SR-PR, serial No. 174.
1—Royer Shakeout Machine with Motor, 64" long x 52" wide, table 29" x 58".
1—Constant Heating Tank with motor and pump, with thermo controls.
1—Waage Air Pressure Wax Machine.
1—Osborn Rollover #203, take plates 36" x 50" with 8" draw, air clamps and air controlled table.

OLD COLONY FOUNDRY CO.
EAST BRIDGEWATER, MASS.

FOR SALE

1000 lb. Lectromelt steel furnace in perfect condition. ADDRESS: DOWLING FOUNDRY CO., SAVANNAH, GA.

For Sale

FOR SALE

1—Whiting #9½ Model B Cupola section E 45' with Tuyeres. Self segments, arranged for 9" thick lower lining, C.I. charging door frame wishbone and grapple.
1—3 Ton capacity Horseshoe charging trolley 11' span 34' lift equipped with GE 3 HP and 15 HP traction and lift slip ring motor 3-60-220 60 FPM drum controllers, resistance grids, including switches, trolley system, etc.

BOX 523
THE FOUNDRY CLEVELAND, 13, OHIO

FOR SALE

SIMPSON TYPE "O" intensive muller type mixer complete with gear reduction less motor. LANCASTER muller type revolving pan mixer 5½ cu. ft., 45" dia. x 15¾" deep. Address: PLANT EQUIPMENT CO., 946 Betts Street, Cincinnati 14, Ohio.

FOR SALE

1—Ransohoff end-loading, end-unloading star return mill for wet milling. 36" x 36" tumbling compartment.
5—Johnson & Jennings, number 401-C, Jack Rabbit portable jolt squeeze machines.

THE RIDGE TOOL CO.
P.O. BOX 270
NEW PHILADELPHIA, OHIO

FOUNDRY EQUIPMENT

48 Inch cupola with blower; Porbeck oven-oil fired—used 6 months; Hydraulic lift charging elevator; Simpson mixer; Champion, International and Davenport air jolt squeezers and pushoff; New Dietert Sand Control unit—complete; one to five thousand pound geared ladles; Large core oven 16 by 24 feet; Exhaust fans; 2 ten ton cranes, cab operated, one 31 ft span, one 47½ ft span; Floor operated 1½ ton crane 31 ft span and flask yard cranes. Jolt rollovers, rattle boxes and sand blast equipment.

WEBER ENGINE CO.
KANSAS CITY, KANSAS

FOR SALE

One Sly 8' x 8' blast room, large capacity generator, elevator, hopper, blower ventilating system, dust collector, 160 cubic ft. Ingersoll Rand air compressor, model 1266. Original cost $8,000.00. May be purchased reasonably. Address: LEWIS A. DeMARCO, VALLEY BANK AND TRUST COMPANY, DES MOINES, IOWA.

FOR SALE

1—Pallet Conveyor, Jeffrey No. 24, 360 ft. of track, motors, 59 cars, elevation above floor 24", cars are spaced 72½", car tops are 48" wide x 60" long of ⅝" steel hydraulic rams pushes molds off conveyor to shake-out.

OLD COLONY FOUNDRY CO.
EAST BRIDGEWATER, MASS.

FOR SALE

Air compressor (National Brake and Electric Co.) with 100 HP, AC, 220 V, 3 Ph, 60 cycle, direct drive motor. 550 C.F.M. at 90 pounds pressure. May be seen at present time in operation. Address: Box 937, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Emery belts, pyrometers, molding shovels, crucibles, crucible lids, Jones backstand grinder, 600# Fisher electric tilt melting furnace, core ovens, Steptoe & McFarlan 10' lathe, 15 H.P. Schramm compressor, hand molding machines, squeezers, Queen City grinder, Campbell Hausfeld furnaces, assorted buffing wheels. Address: A. E. Schnell Mfg. Co., Inc., 1921 Westwood Ave., Cincinnati 14, Ohio.

TWO USED CONNERSVILLE CUPOLA BLOWERS

1—Output 65 cu. ft. per rpm, measuring 24" inlet, 16" outlet.
1—Output 24 cu. ft. per rpm, measuring 18" inlet, 6" outlet.
Make offer.

GEO. J. MEYER MANUFACTURING COMPANY
SOUTH MEYER PLACE & EAST DUMORE COURT, CUDAHY, WISCONSIN

For Sale

WHITING SIDE BLOW CONVERTERS

Two 3-ton side blow converters complete with blower, motors and accessories. Immediate delivery.

INTERNATIONAL FERMONT MACHINERY CO., INC.
111 BROADWAY, NEW YORK 6, N. Y.

FOR SALE

New heavy duty motorized rod cutter, 65 cuts per minute; capacity: ¾ inch round hot rolled steel. Brand new. $890.00 f.o.b. Cleveland. Address: The Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.

FOR SALE

Cast iron core oven car frame 12 ft. x 6 ft., gauge 33 inches.
Core oven racks with double 8 wheel Louden trolleys.
Double end Norton grinders, Model D, 16 inch wheel.
Steel stack 4 foot diameter 44 feet high—also structural steel base for same.
Quantity Louden track and hangers.

BUFFALO SCALE COMPANY, INC.
BUFFALO 13, NEW YORK

FOR SALE

Core Plates

17½" x 32" x ⅛"

18½" x 32" x 3/16"

New Condition—$2.00 ea.

GLAZER BROS., ANDERSON, IND.

SAND BLAST HOODS

23—surplus rubberized sand blast hoods, including one interchangeable face mask; all unused. Will see all together. Only $50.00.

DES MOINES STOVE REPAIR CO.
DES MOINES, IOWA

OVERHEAD ELECTRIC TRAVELING CRANES

TONS	MAKE	SPAN	CURRENT
3	Shepard	18'6"	230-VDC.
3	Northern	36'0"	220-VAC.
5	Northern	22'0"	230-VDC.
5	Northern	26'0"	230-VDC.
5	Milwaukee	50'0"	230-VDC.
15	Alliance	102'0"	220-VAC.

(With (2) 7½-ton Trolleys)

ELECTRIC MONORAIL HOISTS

QU.	TONS	MAKE	CURRENT
7	½	Lo-Hed & Shepard	230-VDC
1	1	Shaw-Box	220-VAC.
1	2	Shepard	230-VDC.
1**	2	Shepard	220-VAC.
1*	2	Shepard	230-VDC.
3*	3	Lo-Hed	230-VDC.
1*	5	Lo-Hed	220-VAC.

*—2-Motor, Fl. Op. **—2-Motor, Cg. Op.

ALL ABOVE IN STOCK OFFERED REBUILT & GUARANTEED.
SEND FOR OUR STOCK LIST OF A.C. & D.C. GENERAL PURPOSE CRANE & MILL MOTORS, ELECTRIC BRAKE & CONTROL EQUIPMENT, MOTOR GENERATOR SETS, TRANSFORMERS, ETC., OF ALL SIZES.

T. B. MACCABE COMPANY
4300 CLARISSA ST.
PHILADELPHIA (40), PENNA.

Classified Advertising

For Sale

FOR SALE
FOUNDRY EQUIPMENT

2—Adams 10" Jolt Squeeze Moulding Machines.
1—Adams 12" Jolt Squeeze Moulding Machine.
1—Champion 10" Jolt Squeeze Moulding Machine.
1—Champion 12" Jolt Squeeze Moulding Machine.
1—Tabor 13" Moulding Machine.
1—Robins Shakeout Screen 36" x 78".
44—Portable Steel Bins, 36 x 60 x 42 with legs.
70—Crucibles—1000 to 5000#.
4—Bellevue Melting Furnaces 14½" Dia. x 21¼" Deep.
200—Steel Pallets 28" x 48" & 28" x 28".
17—2000# Knapp Tilting Furnaces with hoists
2—Osborn #559 Jolt Strippers.
2—Osborn #2033 Rockove & Draw.
1—Union Melt Welder Model CA.

BLOWERS
COMPRESSORS
& VACUUM PUMPS

1—I.R.—HK-500, Pneumatic Tires, Diesel.
1—I.R.—Type 30—4 & 1½ x 3½—5 H.P. Elec
4—Roots Connersville—22 x 33—7000 CFM, 250 H.P. synchronous motors 3/60/2300 V Belts.
1—Sutorbilt Gas Comp. 8 x 6.5—10 H.P. motor 3/60/440.
10—Fuller C-300 Compressor 1600 CFM @ 35#, direct connected 200 H.P. G.E. Motors 3/60/2300.
16—5 Ft. Fans 3 H.P. motors—20,000 CFM @ ⅜" SP.
4—Kinney Hi-Vac, 8 & 8 x 10—105 CFM.
1—I.R. Low Vacuum, Type 15—12 x 6, 250 CFM.
1—I.R. Low Vacuum, ER-1, 14 x 5, 15 H.P.
9—Stokes—Hi Vacuum Pump 212B—100 CFM.
5—Fuller V-300-200 Two Stage Vacuums, 3 direct connected 100 H.P. motors, 3/60/440.

Blowers from 560 to 12,000 CFM.

THE DARIAN CORP.
60 E. 42nd ST. N. Y. 17, N. Y.

TURBO BLOWERS

2100 cfm @ 10 oz, Spencer, with 10 HP, 220/440 V, 3/60/3600 RPM motor.
(4) 675 cfm @ 6 oz., Spencer, driven by 2 HP, 220/440 V., 3 ph. 60 cycle 3600 RPM.

PRESSURE BLOWERS

1600 cfm @ 2 lb. General Electric with 20 HP, 3/60, 3600 RPM motor.
1400 cfm @ 8 oz. Robinson with 5 HP, 3/60, 3600 RPM motor.
1100 cfm @ 16 oz. Sturtevant
800 cfm @ 24 oz. American with 10 HP, 3/60, 3600 RPM motor
500 cfm @ 14 oz. McKee, with 5 HP, 3/60, 3600 RPM motor.

HOISTS

¼ Ton—Detroit Titan—440/3/60
⅛ Ton—Budget—220/3/60
⅛ Ton—Comet—440/3/60
¼ Ton—Shepard—220 D.C.
½ Ton—Chisholm Moore—440/3/60
½ Ton—Cleveland—440/3/60

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND 14, OHIO

FOR SALE

No. 2 Climax core rod straightener. Used very little, $350.00. Address: Illinois Foundry Co., Springfield, Ill.

FOR SALE

Tabor abrasive cut off machine. Type DAC-5-HP, 220V, 3 PH, 60-cy. Very good condition. $400.00. Address: George Staub, 22 Berriman St., Brooklyn 8, New York.

FOR SALE

80 various sizes snap flasks. Miscellaneous sizes of abrasive and steel rotary files. Large quantities. Address: Box 949, The FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE

Schutte & Koerting tumbling and washing barrel, inside dimension of barrel 24" deep, 28" wide, 1⅝ bronze..... $450.00
Glove tumbling barrel, 3 HP motor 220/440/60/3, push button cont..... 175.00
Nichols portable jolt strip molding machine, 26" x 27" table..... 275.00
International portable jolt strip molding machine, 16" x 30" table 150.00
Tabor stationary jolt squeeze molding machine, 16" x 16" table..... 150.00
Roller conveyor, ball bearing, almost new, random lengths, 8 to 10 ft. Per ft 3.50
Buffalo MX blower, flat belt drive, not motorized 55.00
International portable jolt strip molding machine, 20 x 22" table..... 250.00
Osborn jolt squeeze molding machine, 14 x 18" table 165.00
Milwaukee portable jolt squeeze molding machine, 17 x 21" table..... 140.00

BILLARD MACHINE & TOOL CO.
PHONE 44 MANSFIELD, PENNA.

FOR SALE

Waite & Bartlett 220 volt—type 722—X-Ray machine with instruments and parts, housing and development room.

OLD COLONY FOUNDRY CO.
EAST BRIDGEWATER, MASS.

FOR SALE

Machine shop tools released for private industry:— 36" band saw $225. 30" band saw $275. 32" band saw with built-in 220/3/60 motor $500. Pressure blower 1½" pipe size $20. Time clock for 100 employees $50. 25" disc grinder like new $250. Pangborn small sand blast outfit $230. Flexible shaft grinder 220/3/60 motor, like new $120. 24" x 10' engine lathe $490. 24" x 8'—$340. 18" x 8'—$240. Money back guarantee. Address: CONVERSION PARTS CO., 288 Adams St., Boston 22, Mass.

FOR SALE

The following foundry equipment is almost new—priced to sell!!

(2) Osborn Type 405-77 Moulding Jolt Rollover and Pattern Draw—size 64" x 50" with run-out car

(1) Osborn Type 2047 Moulding Jolt Rollover and Draw—size 22½" x 21½"

(2) International Type ENC Clamp & Draw—size 76" x 9½" Draw

(8) Int. Type "J" Air Jar—5"—(16" x 27")

(5) Int. Type "REP" Air Clamp—Power Rollover

(4) Int. Type "YOL" & Type "ACR" Combination Rollover and Oil Draw

All the listed equipment can be inspected at our warehouse and immediate shipment made.

GLOBE TRADING COMPANY
1815 FRANKLIN STREET
DETROIT (7), MICHIGAN
CAD. 8277

For Sale

6 ton Capacity

HEROULT ELECTRIC FURNACE

Tilting Type

1, 6 ton shell—1, 3 ton shell

Complete with all electrical controls.

IRON & STEEL PRODUCTS, INC.
43 years' experience
13444 S. Brainard Ave., Chicago 33, Ill.

"ANYTHING containing IRON or STEEL"

FOR SALE

1—Fisher Tilting Furnace, Type SM, 500 alum. capacity, Serial #2517, Swing Cover valves for oil firing Spencer-Turbo Blower, 4—Burners Gas, 1—Burner for Oil. Blower has ½ HP Single Phase Motor—and can be used for either gas or oil.
1—Osborn #601 Stationary Jolt Rollover Molding Machine, with levelling device, Serial #73201, 30" long, 16" wide.
1—Spencer-Turbo Blower, 5 HP, 900 C.F.M., 12 ounce.
1—Demmler #1 Core Blower, Serial #888, Like New.
Roller Conveyors, 10"—12"—14"—16"—18"—24" wide, in Standard 8' and 10' lengths. With and without stands, rollers above frame or below as desired.
600—Electric Motors in Stock, all sizes, types and horsepowers.
1—Complete Pangborn Sand Blast Room, which includes all the necessary parts, Size 13 x 13 x10. Excellent Condition.
1—Jeffrey Sanditioner, with Pneumatic Tires, Serial #47647-0-133523, with Allis Chalmers 2 HP, 220-440/60 cycle 3 phase motor, excellent condition.
2—Double End Grinders, Roller Bearings, 5 HP Motor, Wheels 16"x3", at 38" centers.
2—Ingersoll Rand Blowers, Single Stage, Centrifugal Type. Type FS-345, 3600 C.F.p.M. with GE Electric Motor 25 HP, 50-60 cycles, 3 phase, 220-440/60 cycles.
2—5000# Howe Floor Scales—Good condition.
163—Dixon #150 Crucibles with 4" Lip.
1—American Sand Cutter, Style C. P. Size 72", serial No. 115-R. Distance between wheels 96", Actual Cutting Blades 72", Overall length 102", Type C. D.

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 BROAD ST.,
SHILLINGTON, READING, PA.

FOR SALE

119 cast iron Holloware matchplates such as dutchovens, chickenfryers, skillets, griddles, oblong broiler, broiler chicken pan, broiler skillet, waffle iron and novelties. Address: Box 943, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Patterns and stock on hand for A 1-2-3 burner gas hot plate and A 2-3 burner. Laundry stove with 18-30 inch legs. Cuts can be mailed showing line of stoves. Address: Box 952, The FOUNDRY, Cleveland 13, Ohio.

OVERHEAD CRANES

1—6 ton Morgan, 46' span, cab operated, 230 V.D.C.

2—10 ton American Monorail, floor operated, 29' span, 3/60/220

1—25 ton Morgan, 60' span, cab operated, 230 V.D.C., with 50 KVA G.E. Generator

1—40 ton Browning, 70' span, 4 motor, 230 V.D.C.

IRON & STEEL PRODUCTS, INC.
13444 S. BRAINARD AVE., CHICAGO 33, ILL.

"ANYTHING containing IRON or STEEL"

Classified Advertising

For Sale

FOR SALE

2—Tabor Core Machines 8 x 16
1—Tabor Jolt Squeezer 10" Portable
6—Milwaukee Jolt Squeezer 10" Portable
3—Milwaukee Jolt Squeezer 12" Stationary
1—Milwaukee Jolt Squeezer 14" Stationary
1—Herman Plain Bumper 40 x 58 Table
1—Wadsworth Stock Core Machine No. 2. ¼ to ½ Core
1000 Ft. Air Hose ⅜, ½, ¾
1—International Core Machine 14 x 10
1—Hand Sprue Cutter
2—3 Ton Modern Ladle
1—3 Ton Tea-Spout, Pour Modern Ladle
4—2 Ton Little Giant Air-Hoist
2—Swing Grinders Mummert 16 x 2½ Wheel
1—Stand Grinder 3 HP Motor, 16 x 2½ Wheel
1—Stand Grinder 10 HP Motor, 24 x 2½ Wheel
1—Jeffrey Sand Conditioner, Pneumatic Tires
1—Generator Tank, Complete with Helmet, for Sand Blast Room
1—Square Tumbling Barrel, 60 x 30 x 36
AIR COMPRESSORS
1—4½ x 4½ with Motor & Tank
1—Ingersoll Rand No. 63832, Class E.R.—2, Air Cyl. 7 x 3½ x 5
CORE OVENS, like new
1—Half Round with 5 shelves, 51" High 54" Wide, 27" Deep
We also make New Core Ovens any style or type desired — Shelf, Pullout Drawer or Car Type.
FURNACES
2—Fisher Brass & Aluminum Furnaces, Type S Complete with Burner, New Motor and Blower.
GRINDERS
3—Flexible Grinders, practically new. (2—with 2 Hp Motor) (1 with 1 HP Motor)
INTERNATIONAL MACHINES
7—International J.D.P., Power Jolt Power Lift.
2—International Hand Operated Rollover Machines, Table 17 x 22.
LADLES—WE MAKE NEW LADLES
1—8 Ton Worm Geared
1—1800 lb. Track Ladle, Worm Gear, Ball Bearing
MIXERS
1—Blystone Mixers
1—6' Simpson Mixer
1—4' Lancaster Mixer Complete with loading bucket
1—4' Simpson Mixer with Speed Reducer and Motor
OTHER JOLT SQUEEZER MACHINES
2—Milwaukee Rebuilt Jolt Squeezers
2—Moline Hand Squeezers Straddle Type
RIDDLES & RIDDLE BOTTOMS
20" Electric Riddle Bottoms
18" Hand Riddles, 5 Ply
ROLLOVER MACHINES
2—24G Machines Rollover
1—"G" Rollover Machines 20 x 8
1—Tabor Side Rollover Machine
SAND BLAST BARRELS
2—No. 4 Tilting Type
SAND BLAST CABINETS
1—Type K, 48" x 48" x 42" with Dust Arrestor, Practically New
SAND CUTTERS
1—45" American Sand Cutter, Elec., Type AM.

STEEL FLASKS

40 Sets	12 x 31—10	cope and 10	drag	Price Per Set	$14.00
50 Sets	11 x 41— 4	cope and 6	drag	Price Per Set	15.00
30 Sets	12 x 31— 7	cope and 7	drag	Price Per Set	16.00
30 Sets	18 x 19—4½	cope and 4½	drag	Price Per Set	11.00
40 Sets	18 Round—4	cope and 3	drag	Price Per Set	7.00
25 Sets	13 x 35— 6	cope and 6	drag	Price Per Set	15.00

SAND CONDITIONER
1—Royer Sand Conditioner
1—Jeffrey Sand Conditioner
SCALES
1—Toledo Scale, new
SPRUE CUTTERS
1—Sprue Cutter with 2 HP Motor
MISCELLANEOUS EQUIPMENT
Hand Trucks #792 Fairbanks
3—Barrel Trucks, 2 wheel Rubber Tires
Pneumatic Tires, 600# Capacity
1—Automatic Lift Truck & Charger
Lyon-Raymond Hyd. Lift Truck
2500# Cap. Model CW 11-54
Air Bench Rammers
Air Floor Rammers
Air Grinders Portable
Chipping Hammers
Vibrators
Branford Shakeout Vibrators
Assortment of New Emery Wheels
1—Scleroscope
High Speed Motors & Blowers for Brass Furnaces, several different sizes.
2000 Ft. of new ⅜" Air Hose
1000 Ft. of new ¾" Air Hose
Different Sizes of Roller Conveyor:
80' of 19' wide, 1¾" dia. rolls 4" centers.
150' of 16' wide, 3" dia. rolls—3 rolls to a ft.
70' of 16' wide, 2" dia. rolls—4 rolls to a ft.
1—North American Cupola Blower with 15 HP Motor, direct drive.

ALUMINUM JACKETS

8—10 x 18
6—14 x 14
5—12 x 18
4—12 x 20
6—14 x 18
4—14 x 16

ALUMINUM CORE PLATES

37—12 x 15½

WOOD SNAP FLASKS

1—22 x 22 5 Cope 5 Drag
1—20 x 20 5 Cope 5 Drag
1—18 x 18 5 Cope 5 Drag
3—18 x 18 4 Cope 4 Drag
1—16 x 26 5 Cope 5 Drag
1—16 x 22 5 Cope 5 Drag
3—16 x 18 5 Cope 5 Drag
3—16 x 16 5 Cope 5 Drag
1—16 x 16 4 Cope 4 Drag
1—15 x 15 5 Cope 5 Drag
2—12 x 24 5 Cope 5 Drag
4—12 x 22 5 Cope 5 Drag
1—12 x 22 5 Cope 4 Drag
4—12 x 20 5 Cope 5 Drag
7—12 x 18 5 Cope 5 Drag
1—12 x 18 4 Cope 4 Drag
2—12 x 18 3 Cope 3 Drag
5—12 x 16 5 Cope 5 Drag
3—12 x 16 5 Cope 3 Drag
6—12 x 14 5 Cope 5 Drag
7—12 x 12 5 Cope 5 Drag
1—10 x 16 5 Cope 4 Drag
1—Ladle Flask
1—14 x 27 5 Cope 3 Drag
2—14 x 24 5 Cope 5 Drag
2—14 x 22 5 Cope 5 Drag
2—14 x 20 5 Cope 5 Drag
5—14 x 18 5 Cope 5 Drag
3—14 x 16 5 Cope 5 Drag
1—14 x 16 5 Cope 4 Drag
7—14 x 14 5 Cope 5 Drag
1—14 x 14 4 Cope 5 Drag
1—12 x 30 5 Cope 5 Drag
1—12 x 12 3 Cope 3 Drag (Alum.)
1—10 x 34 5 Cope 5 Drag
1—10 x 32 5 Cope 5 Drag
1—10 x 24 7 Cope 6 Drag (New)
1—10 x 24 5 Cope 5 Drag (Aluminum)
1—10 x 22 5 Cope 5 Drag
3—10 x 20 7 Cope 6 Drag (New)
1—10 x 20 5 Cope 5 Drag
3—10 x 18 5 Cope 5 Drag
9—10 x 16 5 Cope 5 Drag
1— 9 x 22 4 Cope 5 Drag
40—21 x 21 4 Cope 4 Drag

HAYNES FOUNDRY EQUIPMENT CO.
814 ADA STREET
KALAMAZOO 52, MICHIGAN

For Sale

EQUIPMENT FOR SALE

MOLDING MACHINES
4—#815-B Johnston & Jennings jolt-rollover-draw 30" x 40" table, 15" draw.
3—75J Osborn Jolt Squeeze
2—SPO #611-B Stationary Oscillating Squeeze Strippers
1—SPO #4½ JHS Air Jolt Hand Strip
1—Tabor Plain Squeeze, Strain Rod Type
3—Mumford 3" Cyl. Core Jolt, with 20" x 15" Table

BLOWERS FOR CUPOLAS AND FURNACES
1—16 x 24 HD Connersville 2500 CFM at 5 lbs.
6—#805 General Blowers, 5 HP, 3/60/220, 1400 CFM at 8-oz. pressure
1—16 x 48 Connersville rotary blower—4500 CFM
Maxon-Premix Blowers for Gas, ⅛ to 1 H.P.

METAL MELTING EQUIPMENT
1—Recirculating Gas Fired Oven with all controls, suitable for Core Oven
2—Hausfeld 1000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired
2—Hausfeld 2000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired
1—Aluminum Electric Heat Treating Unit, 75 KW, 220 Volt, Batch Type, with Basket and Quench Tank
3—Stationary Gas Fired #60 Crucible Furnaces, with ¼ H.P. Maxon-Premix Blowers
2—Monarch-Rockwell Rotating, 500# Brass. Oil
New 32" to 41" Dia. Shell Cupolas made to order

TUMBLING MILLS AND SAND BLAST
1—Pangborn #2 Barrel, Suction Feed, Motor Drive, Complete
1—American Foundry Equipment Co. Stationary Cabinet Type Wheelabrator, complete with Elevator and all Motors
1—American Foundry Equipment Co. Wheelabrator, 45" Dia. Table, Complete with Motors
1—Sand Blast Room, 10' x 10' x 6½'
4—New Haven 36" x 46" Self Contained Sand Blast Barrels, Belt Drive.
2—Pangborn Syphon Feed Sand Blast Cabinets
3—Portable Sand Blast Generator Tanks, 500# Sand Capacity
1—Pangborn Sand Blast Unit including generating tank, shot cleaner, bucket elevator and dust collector with motor. Suitable for use with room.

1—Mono-Rail System Complete with approximately 1200 ft. of track, 74—250# capacity 110 Volt hoists, two and four wheel trolleys, switches, 35—2000# 20 ft. bridges, and all necessary parts to install.

MISCELLANEOUS
4—Heavy duty flexible shaft grinders
1—Model "M" Beardsley-Piper Screenerator, 3 H.P., 220 Volt, 3 Phase, on Rubber Tires
30—Jib Cranes, Floor Type, 1000 to 4000 lbs. capacity, 180° swing, 10 to 15 ft. arms
30—1000 lbs. Capacity Budget Electric Hoists
5—Sturtevant Dry Type Dust Collector Exhausters, 12500 CFM with 25 H.P. Motors
5—Low Lift Electric Trucks, 2000 lbs. capacity and up. Riding Operator Style
1—Heavy Duty Back Geared Sprue Cutter, 1½" square knives, T & L Pulley Drive
6—Worm Geared Tilting Ingot Mold Stands, 6' to 12' Long
1—Sly 10' x 28' x 7' Sand Blast Room complete with mechanical shot handling and four 5-Ton cars.
1—Beardsley & Piper Stationary Hydraulically-controlled Speedslinger, 10' to 20' radius swing, 60 HP ramming motor.
Miscellaneous Electrical and Gravity Conveyor Systems

CLIFTON MACHINERY CO.
1023 W. 6th ST. CINCINNATI 3, OHIO
PHONE PARKWAY 7812

Jolt-squeezer molding stations showing that any size Foundry job is a job for Jeffrey.

What JEFFREY Makes:

MOLD CONVEYORS
FLASK FILLERS
AERATORS
SANDITIONERS
PADDLE MIXERS
SCREENS
BIN VALVES
CONVEYORS
BUCKET ELEVATORS

Jeffrey-Equipped means Efficient Operation

A close-up view of a sand preparation plant.

Jeffrey belt conveyor distributing sand to molders' hoppers.

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED 1877

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Complete Line of Material Handling, Processing and Mining Equipment

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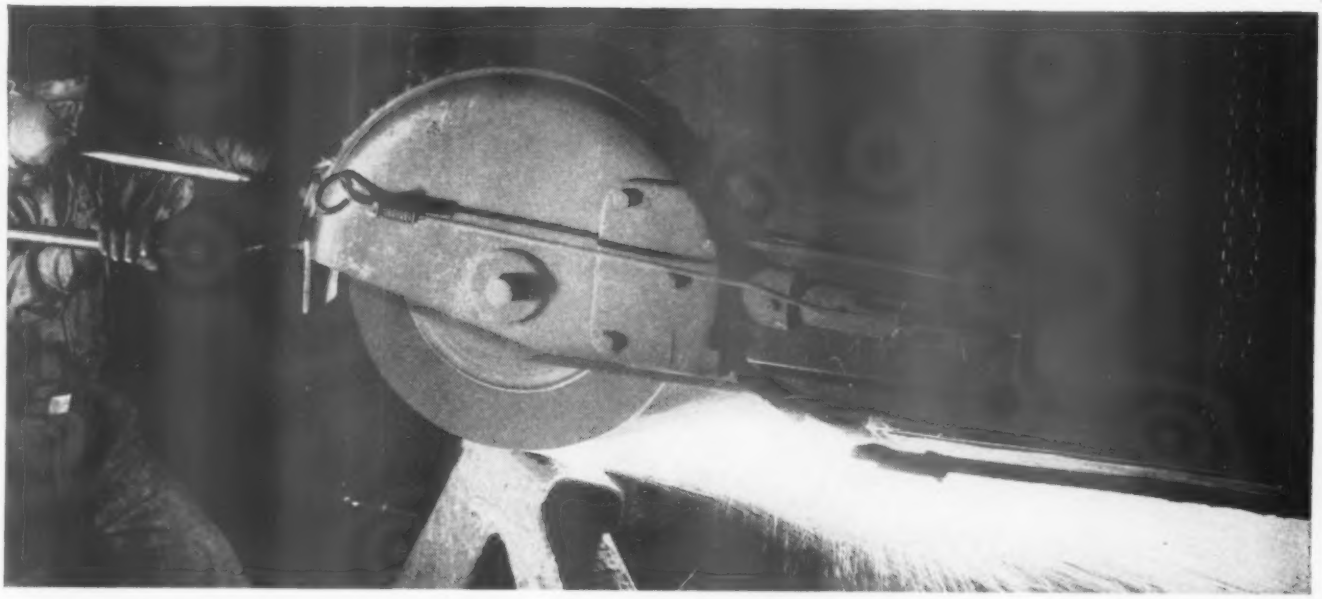

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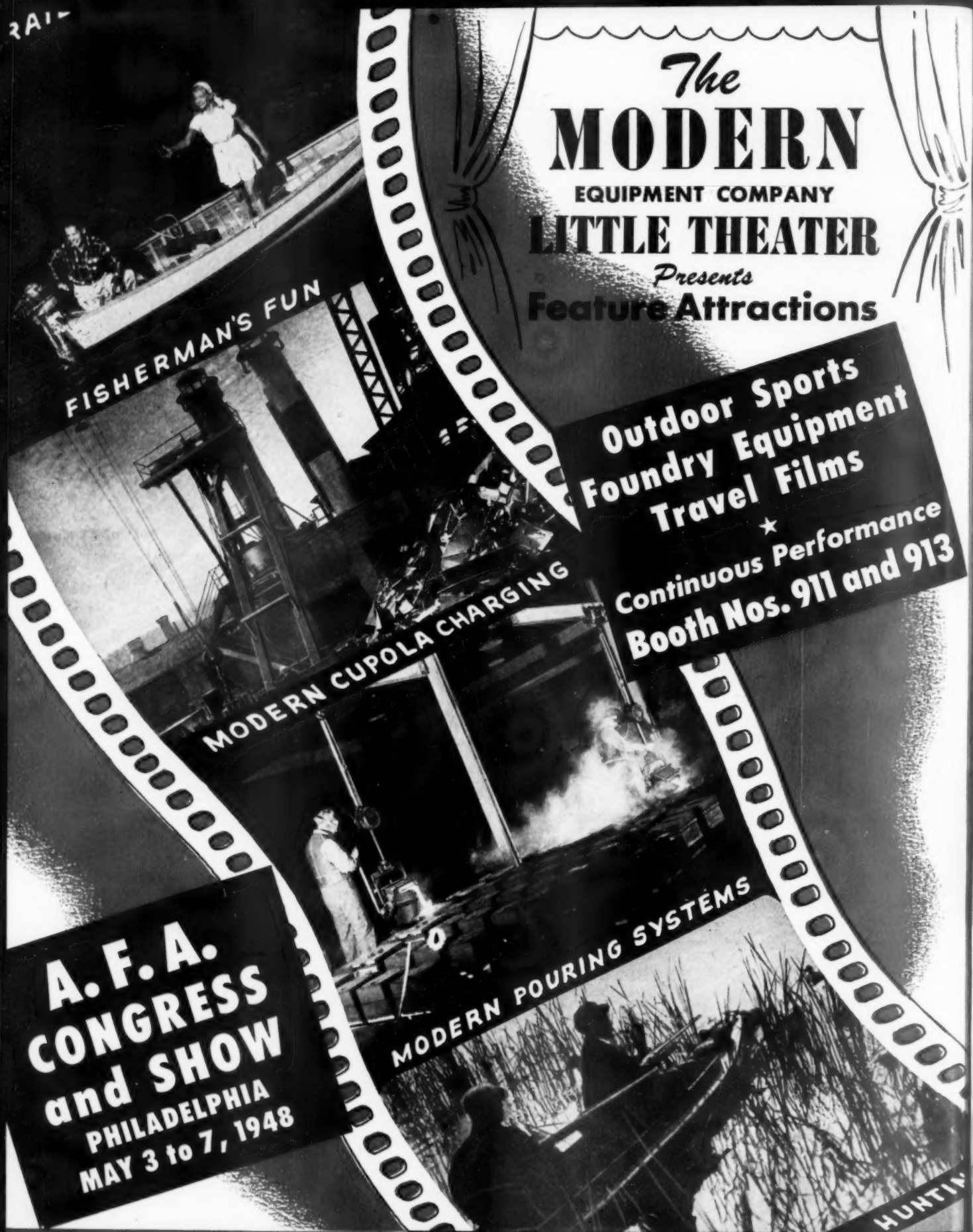
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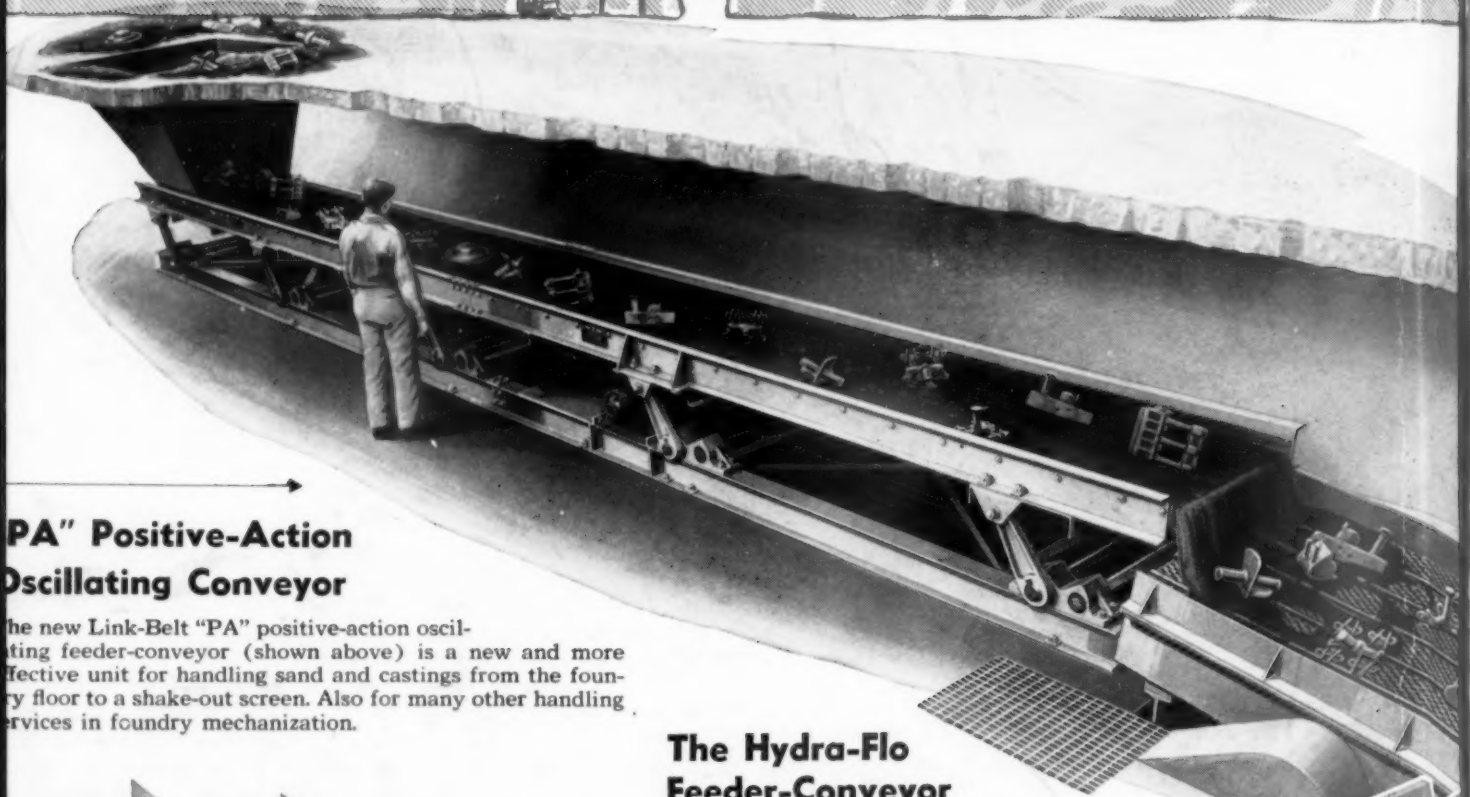
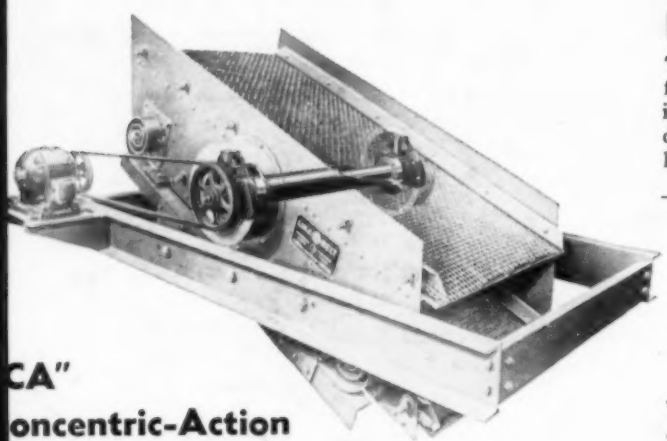


PA" Positive-Action Oscillating Conveyor

he new Link-Belt "PA" positive-action oscil-ting feeder-conveyor (shown above) is a new and more ffective unit for handling sand and castings from the foun-y floor to a shake-out screen. Also for many other handling ervices in foundry mechanization.

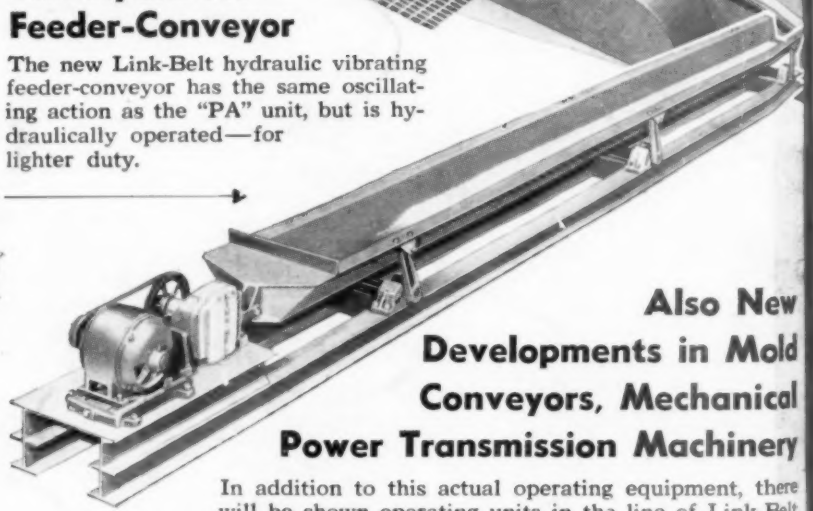
The Hydra-Flo Feeder-Conveyor

The new Link-Belt hydraulic vibrating feeder-conveyor has the same oscillating action as the "PA" unit, but is hydraulically operated—for lighter duty.



CA" oncentric-Action and and Shakeout Screens

his new concentric-action screen (shown above) was de-gned to meet the demand for a more economical and ficient unit for foundry use. Full size screen on exhibit the show.



Also New Developments in Mold Conveyors, Mechanical Power Transmission Machinery

In addition to this actual operating equipment, there will be shown operating units in the line of Link-Belt packaged power transmission machinery, including Electrofluid drives, enclosed gear drives, gearmotors, variable speed transmissions and chain drives. Sections of mold conveyors showing the latest Link-Belt designs for both tight flask and snap flask molds will be shown, as well as other equipment such as overhead trolley and belt conveyors.

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